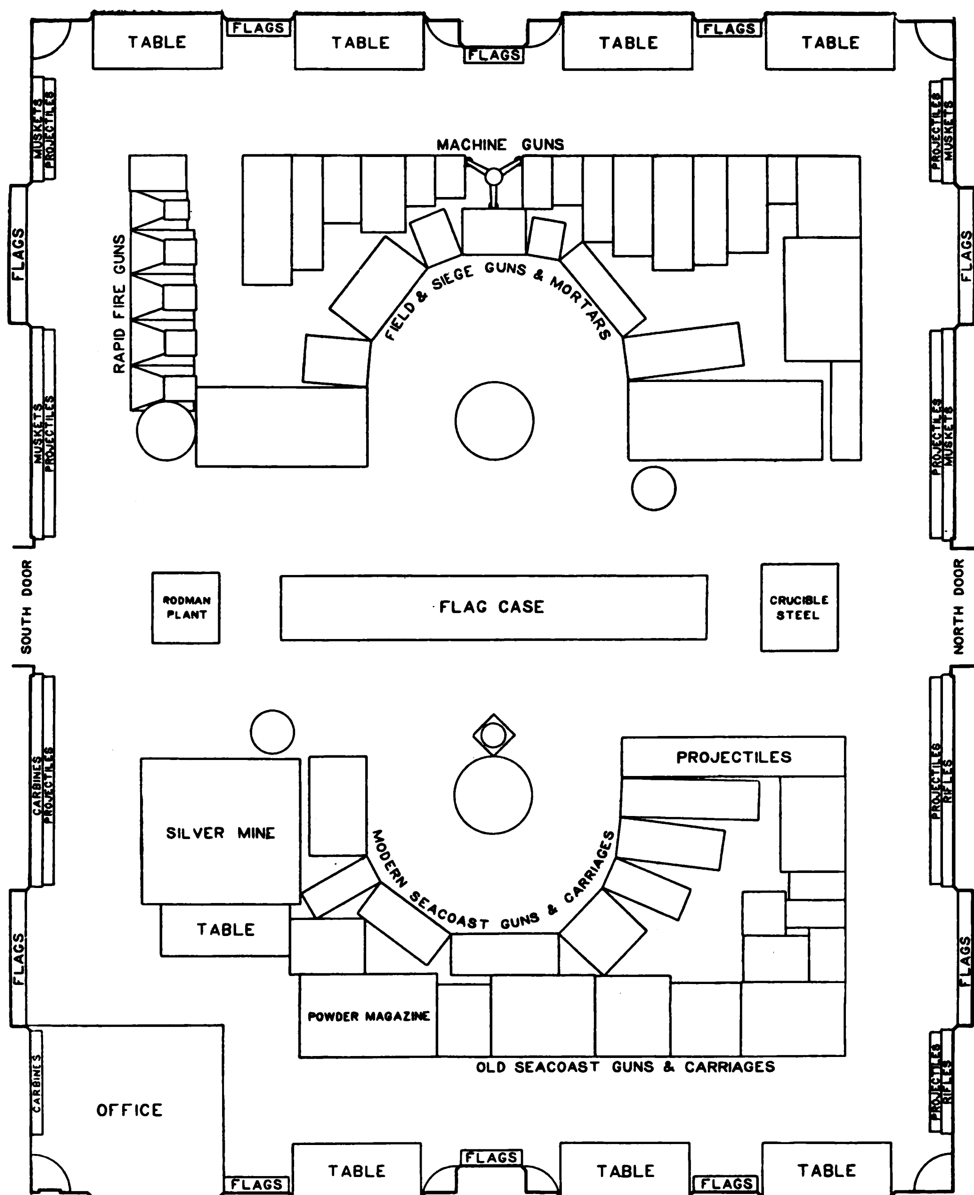




CATALOGUE
OF
ORDNANCE MUSEUM

DEPARTMENT OF
ORDNANCE AND GUNNERY
U. S. MILITARY ACADEMY

C. W. Sawyer, Boston.



FLOOR PLAN OF MUSEUM.

A

DESCRIPTIVE CATALOGUE

OF THE

ORDNANCE MUSEUM

Department of Ordnance and Gunnery
U. S. Military Academy



Prepared under the Direction of Captain L. L. BRUFF, Ordnance Dep't, U. S. A.
Instructor of Ordnance and Gunnery

By Captain JOHN T. THOMPSON, Ordnance Dep't, U. S. A.
Assistant Instructor of Ordnance and Gunnery



WEST POINT
U. S. Military Academy Press
1898


HARVARD
UNIVERSITY
LIBRARY

PREFACE.

In the compilation of this Descriptive Catalogue, the following works have been used, and, in many cases, quoted *verbatim:*

Reports of the Chief of Ordnance, U. S. A., Generals S. V. Benét and D. W. Flagler.

Ordnance Construction Notes.

Ordnance Notes.

"Modern Guns and Mortars Adopted in the U. S. Service," Captains Morrison and Ayres, Ordnance Department.

Benton's, Metcalfe's, and Bruff's Ordnance and Gunnery.

Official Catalogue of the War Department at the Centennial Exposition, Cincinnati, Ohio, 1888, Captain A. H. Russell, Ordnance Department, to whom special acknowledgement of assistance is due.

Ordnance Manual 1850 and 1860.

Tidball's Heavy Artillery.

Roberts' Hand-Book of Artillery.

Mordecai's Artillery Plates.

Abbot's "Siege Artillery in the Campaign against Richmond."

Michie's "Notes on Confederate Torpedoes and Ordnance (manuscript) with plates."

Birnie's "Gun-making in the United States."

"Information Concerning British Trophy Flags in Cadet Chapel," Captain J. M. Carson, U. S. A.

CONTENTS.

SECTION I—CANNON.

This section contains:—an interesting collection of old and experimental United States guns; the trophy guns of the Revolution and of the Mexican War; Confederate guns (the gun said to have fired the first shot in the Civil War), and the gun which fired the last shot previous to Lee's surrender at Appomatox Court House; the guns of two celebrated batteries of the Mexican War (Ringgold's and Duncan's); some of the first attempts in this Country at machine and quick-firing gun construction, together with a few of the latest machine guns, including Gatlings and the Maxim automatic machine gun.

The guns presented by Congress to Major General Greene, and a gun presented by General LaFayette to the Congress of the Revolution, are included in this section.

Early Cannon.—The first cannon used, after the invention of gun powder, were of conical shape, resembling an apothecary's mortar. They were called *mortars*, *bombards*, and *vases*, were fired at high angles and threw stone balls. These were followed by the *perrieres*, with cylindrical bore and narrow powder chamber. The first bombards were made of bars of iron bound together by hoops like the staves of a barrel. Afterward cannon were made of wrought iron and finally of cast metal. Breech-loading cannon were found among the earliest constructions, but were abandoned for want of strength and solidity. The introduction of cast iron projectiles led to a new style of cannon, the *culverins*, of considerable length of bore, which very nearly correspond in form to the later guns. Bronze guns were used in the time of King John of France.

MEXICAN TROPHIES.

Guns, Howitzers, Mortars, Etc.

No.

1. **8-pdr. Mexican brass gun with handles, cal. 4."25.**
Captured at Resaca de la Palma, May 9, 1846. At Trophy Point.

2. **8-pdr. Mexican brass gun with handles, cal. 4."25.**
Captured at Resaca de la Palma, May 9, 1846. In Memorial Hall.

3. **6-pdr. Mexican brass gun with handles, cal. 3⅝".**
Captured at Resaca de la Palma, May 9, 1846. In Chapel.

4. **6-pdr. Mexican brass gun without handles, cal. 3."6.**
Captured at Resaca de la Palma, May 9, 1846. In Memorial Hall.

5. **4-pdr. Mexican brass gun with handles, cal. 3."45.**
Captured at Resaca de la Palma, May 9, 1846. In Memorial Hall.

6. **4-pdr. Mexican brass gun with handles, cal. 3."35.**
Captured at Resaca de la Palma, May 9, 1846. In Memorial Hall.

7. **4-pdr. Mexican brass gun with handles, cal. 3."4.**
Captured at Resaca de la Palma, May 9, 1846. In Memorial Hall.

8. **4-pdr. Mexican brass gun with handles, cal. 3."5.**
Captured at Resaca de la Palma, May 9, 1846. In Memorial Hall.

9. **8-pdr. Mexican brass gun with handles, cal. 4."25.**
Captured at Matamoras, May 18, 1846. At Trophy Point.

10. **4-pdr. Mexican brass gun without handles, cal. 3."35.**
Captured at Matamoras, May 18, 1846. In Memorial Hall.

11. **4-pdr. Mexican brass howitzer without handles, cal. 3."75.**
Captured at Matamoras, May 18, 1846. At Ordnance Laboratory.

12. **50-pdr. Dahlgren Naval rifled gun.**
At Trophy Point.

13. **6½-inch Mexican bronze howitzer with handles.**
Captured at Matamoras, May 18, 1846. At Trophy Point.

14. 12-pdr. Mexican brass gun with handles, cal. 4."8.
Surrendered at Monterey, September 23, 1846. At Trophy Point.

15. 8-pdr. Mexican brass gun without handles, cal. 4."25.
Surrendered at Monterey, September 23, 1846. At Trophy Point.

16. 8-pdr. Mexican brass gun without handles, cal. 4."25.
Surrendered at Monterey, September 23, 1846. At Trophy Point.

17. 8-pdr. Mexican brass gun with handles, cal. 4."35.
Surrendered at Monterey, September 23, 1846. At Trophy Point.

18. 9-inch Dahlgren Naval smooth-bore gun.
At Trophy Point.

19. 4-pdr. Mexican brass gun with handles, cal. $3\frac{7}{16}$".
Surrendered at Monterey, September 23, 1846. In Chapel.

20. 6½-inch Mexican bronze howitzer, cal. 3."75.
Surrendered at Monterey, September 23, 1846. At Trophy Point.

21. 4-pdr. Mexican brass mountain howitzer, cal. 3."75.
Surrendered at Monterey, September 23, 1846.
At Ordnance Laboratory.

22. 4-pdr. Mexican brass mountain howitzer without handles, cal. 3."75.
Surrendered at Monterey, September 23, 1846.
At Ordnance Laboratory.

23. 24-pdr. U. S. bronze Coehorn mortar and bed.
At Laboratory Yard.

24. 16-pdr. Mexican brass gun without handles, cal. 5."25.
Surrendered at Vera Cruz, March 29, 1847. At Trophy Point.

25. 16-pdr. Mexican brass gun without handles, cal. 5."25.
Surrendered at Vera Cruz, March 29, 1847. At Trophy Point.

26. 16-pdr. Mexican brass gun with handles, cal. 5."35.
Surrendered at Vera Cruz, March 29, 1847. At Memorial Hall.

27. 12-pdr. Mexican brass gun with handles, cal. 4."8.
Surrendered at Vera Cruz, March 29, 1847. At Memorial Hall.

28. **12-pdr. Mexican brass gun with handles, cal. 4."75.**
Surrendered at Vera Cruz, March 29, 1847. At Trophy Point.

29. **12-pdr. Mexican brass gun with handles, cal. 4."7.**
Surrendered at Vera Cruz, March 29, 1847. At Trophy Point.

30. **8-pdr. Mexican brass gun without handles, cal. 4."2.**
Surrendered at Vera Cruz, March 29, 1847. At Trophy Point.

31. **6-pdr. Mexican brass gun with handles, cal. 3."75.**
Surrendered at Vera Cruz, March 29, 1847. In Memorial Hall.

32. **6-pdr. Mexican brass gun with handles, cal. 3."75.**
Surrendered at Vera Cruz, March 29, 1847. In Chapel.

33. **4-pdr. Mexican brass gun without handles, cal. 3."5.**
Surrendered at Vera Cruz, March 29, 1847. In Memorial Hall.

34. **10-inch Mexican bronze mortar with handles.**
Surrendered at Vera Cruz, March 29, 1847. At Trophy Point.

35. **8-pdr. Mexican brass gun with handles, cal. 4."2.**
Captured at Cerro Gordo, April 18, 1847. At Trophy Point.

36. **6-pdr. Mexican brass gun without handles, cal. 3."6.**
Captured at Cerro Gordo, April 18, 1847. In Memorial Hall.

37. **6-pdr. Mexican brass gun with handles, cal. 3."4.**
Captured at Cerro Gordo, April 18, 1847. In Memorial Hall.

38. **4-pdr. Mexican brass gun without handles, cal. 3."5.**
Captured at Cerro Gordo, April 18, 1847. In Memorial Hall.

39. **4-pdr. Mexican brass gun without handles, cal. 3."5.**
Captured at Cerro Gordo, April 18, 1847. In Memorial Hall.

40. **4-pdr. Mexican brass gun without handles, cal. 3."35.**
Captured at Cerro Gordo, April 18, 1847. In Memorial Hall.

41. **17-inch Mexican bronze mortar with bed, one handle.**
Surrendered at Perote Castle, April 22, 1847. "El. Gladitano."
At Trophy Point,

42. 17-inch Mexican bronze mortar with bed, one handle.
Surrendered at Perote Castle, April 22, 1847. "El. Boitre."
At Trophy Point.

43. 17-inch Mexican bronze mortar with bed, one handle.
Surrendered at Perote Castle, April 22, 1847. "El. Titan."
At Trophy Point.

44. 17-inch Mexican bronze mortar with bed, one handle.
Surrendered at Perote Castle, April 22, 1847. "El. Buitre."
At Trophy Point.

45. 16-pdr. Mexican brass gun without handles, cal. 5."2.
Captured at Contreras, August 20, 1847. At Trophy Point.

46. 12-pdr. Mexican brass gun without handles, cal. 4."8.
Captured at Contreras, August 20, 1847. At Trophy Point.

47. 12-pdr. Mexican brass gun with handles, cal. 4."85.
Captured at Contreras, August 20, 1847. At Trophy Point.

48. 12-pdr. Mexican brass gun with handles, cal. 4."8.
Captured at Contreras, August 20, 1847. At Trophy Point.

49. 8-pdr. Mexican brass gun with handles, cal. 4."2.
Captured at Contreras, August 20, 1847. At Trophy Point.

50. 8-pdr. Mexican brass gun with handles, cal. 4."2.
Captured at Contreras, August 20, 1847. In Memorial Hall.

51. 6-pdr. Mexican brass gun with handles, cal. 3."75.
Captured at Contreras, August 20, 1847. At Trophy Point.

52. 6-pdr. Mexican brass gun with handles, cal. 3."85.
Captured at Contreras, August 20, 1847. In Memorial Hall.

53. 6-pdr. Mexican brass gun without handles, cal. 3."9.
Captured at Contreras, August 20, 1847. In Memorial Hall.

54. 6-pdr. Mexican brass gun with handles, cal. 3."5.
Captured at Contreras, August 20, 1847. In Memorial Hall.

55. 4-pdr. Mexican brass gun without handles, cal. 3."4.
Captured at Contreras, August 20, 1847. In Memorial Hall.

56. 4-pdr. Mexican brass gun without handles, cal. 3."6.
Captured at Contreras, August 20, 1847. In Memorial Hall.

57. 4-pdr. Mexican brass gun with handles, cal. 3."4.
Captured at Contreras, August 20, 1847. In Memorial Hall.

58. 4-pdr. Mexican brass gun with handles, cal. 3."45.
Captured at Contreras, August 20, 1847. In Memorial Hall.

59. 8-inch Mexican brass howitzer without handles, English manufacture.
Captured at Contreras, August 20, 1847. At Trophy Point.

60. 8-inch Mexican brass howitzer without handles, English manufacture.
Captured at Contreras, August 20, 1847. At Trophy Point.

61. 8-inch Mexican brass howitzer without handles, English manufacture.
Captured at Contreras, August 20, 1847. At Trophy Point.

62. 8-inch Mexican brass howitzer without handles, English manufacture.
Captured at Contreras, August 20, 1847. At Trophy Point.

63. 6½-inch Mexican brass howitzer with handles.
Captured at Contreras, August 20, 1847. At Trophy Point.

64. 7½-inch Mexican brass mortar without handles.
Captured at Contreras, August 20, 1847. At Trophy Point.

65. 16-pdr. Mexican brass gun without handles, cal. 5."25.
Captured at San Antonio, August 20, 1847. At Trophy Point.

66. 16-pdr. Mexican brass gun without handles, cal. 5."25.
Captured at San Antonio, August 20, 1847. At Trophy Point.

67. 4-pdr. Mexican brass gun without handles, cal. 3."45.
Captured at San Antonio, August 20, 1847. In Memorial Hall.

68. 16-pdr. Mexican brass gun without handles, cal. 5."25.
Captured at Churubusco, August 20, 1847. At Trophy Point.

69. 8-pdr. Mexican brass gun without handles, cal. 4."2.
Captured at Churubusco, August 20, 1847. In Memorial Hall.

70. 8-pdr. Mexican brass gun with handles, cal. 4."2.
Captured at Churubusco, August 20, 1847. At Trophy Point.

71. 8-pdr. Mexican brass gun without handles, cal. 4."2.
Captured at Churubusco, August 20, 1847. In Memorial Hall.

72. 8-pdr. Mexican brass gun with handles, cal. 4."2.
Captured at Churubusco, August 20, 1847. In Memorial Hall.

73. 6-pdr. Mexican brass gun with handles, cal. 3."75.
Captured at Churubusco, August 20, 1847. In Memorial Hall.

74. 6-pdr. Mexican brass gun without handles, cal. 3."7.
Captured at Churubusco, August 20, 1847. At Trophy Point.

75. 6-pdr. Mexican brass gun without handles, cal. 3."6.
Captured at Churubusco, August 20, 1847. In Memorial Hall.

76. 6-pdr. Mexican brass gun without handles, cal. 3."55.
Captured at Churubusco, August 20, 1847. In Memorial Hall.

77. 4-pdr. Mexican brass gun with handles, cal. 3."45.
Captured at Churubusco, August 20, 1847. In Memorial Hall.

78. 4-pdr. Mexican brass gun with handles, cal. 3."4.
Captured at Churubusco, August 20, 1847. In Memorial Hall.

79. 4-pdr. Mexican brass gun with handles, cal. 3."57.
Captured at Churubusco, August 20, 1847. In Memorial Hall.

80. 6-pdr. Mexican brass gun without handles, cal. 3."85.
Captured at Molino del Rey, September 8, 1847. In Memorial Hall.

81. 6-pdr. Mexican brass gun without handles, cal. 3."85.
Captured at Molino del Rey, September 8, 1847. In Memorial Hall.

82. 4-pdr. Mexican brass gun with handles, cal. 3."45.
Captured at Molino del Rey, September 8, 1847. In Memorial Hall.

83. 24-pdr. Mexican brass gun without handles, cal. 6".
Captured at Chapultepec, September 13, 1847. At Trophy Point.

84. •24-pdr. Mexican brass howitzer with handles, cal. 5."9.
Captured at Chapultepec, September 13, 1847. At Trophy Point.

85. 8-inch Mexican brass howitzer without handles, English manufacture.
Captured at Chapultepec, September 13, 1847. At Trophy Point.

86. 4-pdr. Mexican brass howitzer without handles.
Captured at Chapultepec, September 13, 1847. In Chapel.

87. 4-pdr. Mexican brass howitzer with handles.
Captured at Chapultepec, September 13, 1847. In Chapel.

88. 4-pdr. Mexican brass gun without handles, cal. 3."3.
Captured at City of Mexico, September 13, 1847. At Trophy Point.

89. 4-pdr. Mexican brass gun with handles, cal. 3⅜".
Captured at City of Mexico, September 13, 1847. In Chapel.

90. 12-pdr. Mexican brass gun without handles, cal. 4."7.
Captured at City of Mexico, September 13, 1847. At Trophy Point.

91. 4-pdr. Mexican brass howitzer.
Captured at Huamantla, October 9, 1847. In Chapel.

92. 8-pdr. Mexican brass gun without handles, cal. 4."2.
Captured at Matamoras, November 23, 1847. In Memorial Hall.

93. 6-pdr. Mexican brass gun without handles, cal. 3."8.
Captured at Matamoras, November 23, 1847. In Memorial Hall.

94. 4-pdr. Mexican brass gun without handles, cal. 3."34.
Captured at Matamoras, November 23, 1847. In Memorial Hall.

TROPHY GUNS, REVOLUTION.

Guns, Howitzers, and Mortars, Surrendered and Captured During the Revolutionary War, etc.

95. 3-pdr. small brass field gun.
Surrendered by the English at the Saratoga Convention, October 17, 1777. At Ordnance Laboratory.

96. 12-pdr. English brass gun, cal. 4."75.
Taken at Stony Point, July 16, 1779. In Memorial Hall.

97. 8-inch English bronze howitzer.
Surrendered at the Saratoga Convention, October 17, 1777. At Trophy Point.

98. 6-pdr. brass gun.
"From the British Army, and presented by order of the United States in Congress Assembled, to Major General Greene, as a monument of their high sense of the wisdom, fortitude and military talent, which distinguished his command in the Southern Department, and of his eminent service, which amidst complicated dangers and difficulties, he performed for his country."—October 18, 1783. In Chapel.

99. 6-pdr. brass gun.
"From the British Army, and presented by order of the United States in Congress Assembled, to Major General Greene, as a monument of their high sense of the wisdom, fortitude and military talent, which distinguished his command in the Southern Department, and of the eminent service, which amidst complicated dangers and difficulties, he performed for his country."—October 18, 1783. In Chapel.

100. 10-inch bronze mortar.
Captured at Stony Point, July 16, 1779. At Trophy Point.

101. 4¾-inch English bronze mortar.
Surrendered by the English, at Saratoga Convention, October 17, 1777. In Chapel.

102. 4¾-inch English bronze mortar.
Surrendered by the English, at Saratoga Convention, October 17, 1777. In Chapel.

103. $4\frac{3}{4}$-inch English bronze mortar.

Surrendered by the English, at Saratoga Convention, October 17, 1777. In Chapel.

104. $4\frac{3}{4}$-inch English bronze mortar.

Surrendered by the English, at Saratoga Convention, October 17, 1777. In Chapel.

105. 3-inch Whitworth rifled gun.

At Trophy Point.

106. 3-inch Whitworth rifled gun.

At Trophy Point.

107. 10-inch U. S. cast iron sea-coast mortar, model 1819.

At Trophy Point.

108. 10-inch U. S. cast iron sea-coast mortar, model 1819.

At Trophy Point.

109. 10-inch U. S. cast iron sea-coast mortar, model 1819.

At Trophy Point.

110. $4\frac{3}{4}$-inch English bronze mortar.

Surrendered by the English, at Saratoga Convention, October 17, 1777. In Chapel.

111. $4\frac{3}{4}$-inch bronze mortar.

Surrendered by the English, at Saratoga Convention, October 17, 1777. In Chapel.

112. $4\frac{3}{4}$-inch bronze mortar.

Surrendered by the English, at Saratoga Convention, October 17, 1777. In Chapel.

113. 6-pdr. bronze gun, cal. 3.″55.

The following is the history of this gun:— In Memorial Hall.

ENGINEER DEPARTMENT.

WASHINGTON, August 22, 1843.

Major R. DELAFIELD, Corps of Engineers,
Superintendent U. S. Military Academy,
West Point, N. Y.

SIR:

I have the honor to transmit herewith for preservation at West Point, the following correspondence furnishing a history of a "brass Culverin," which was presented by General La Fayette to the Congress of the Revolution, viz.:

Letter from Major Pinkney to the Secretary of the Treasury, dated August 10, 1843; Secretary of the Treasury to the Secretary of War, August 12, 1843; Secretary of War to the Secretary of the Treasury, August 12, 1843; Captain Hetzel, Assistant Quartermaster, to Captain S. R. Dusenberg, Baltimore, August 19, 1843.

Very respectfully, sir,
Your obedient servant,
(Sgd.) JOS. G. TOTTEN,
Colonel, and Chief Engineer.

OFFICIAL:
(Sgd.) I. McDOWELL,
Lieutenant and Adjutant.

SURVEYOR'S OFFICE, CUSTOM HOUSE,
BALTIMORE, August 10, 1843.

To the
Honorable J. C. SPENCER,
Secretary of the Treasury.

SIR:

When I had the honor in June last of paying my respects to you in Baltimore, on your route to Bunker Hill, I mentioned that a brass Culverin was in the Lazaretto with other condemned cutler's stores, and might probably be sold, as nearly valueless, at some future period.

The gun in question is a beautiful and highly ornamented piece in bas-relief, and bears an inscription attesting it to have been cast in France nearly 140 years ago, and, is well ascertained, to have been presented to Congress at the earliest period of the Revolution.

You expressed a wish to receive it from its present position and send it to West Point as a most interesting relic of a most memorable period, and further directed me to recall the subject to your recollection, upon return to Washington.

It was a present from Marquis de La Fayette.

I have the honor to be, with great consideration, sir,
Your obedient servant,
(Sgd.) WM. PINKNEY,
Superintendent Lazaretto.

OFFICIAL:
(Sgd.) I. McDOWELL,
Lieutenant and Adjutant.

TREASURY DEPARTMENT,
August 12, 1843.

SIR:

I have the honor to transmit herewith a letter from Major Pinkney, Surveyor of the Port of Baltimore, relative to an interesting relic of the Revolution.

As there is no appropriate place under the control of this Department for the preservation of this Culverin I would respectfully inquire, whether you could make room for it at West Point, where I understand similar relics are kept.

Very respectfully, your obedient servant,
(Sgd.) J. C. SPENCER,
Secretary of the Treasury.

Hon. J. M. PORTER, Secretary of War.

OFFICIAL:
(Sgd.) I. McDOWELL,
Lieutenant and Adjutant.

ENDORSEMENT.

These papers are to be filed at West Point as the history of a "brass Culverin" that the Quartermaster at Baltimore has been ordered to receive and transport to that post for preservation by order of the Secretary of War.

WAR DEPARTMENT, August 21, 1843. (Sgd.) D. PARKER.

QUARTERMASTER GENERAL'S OFFICE,

SIR: WASHINGTON CITY, August 19, 1843.

I herewith transmit a copy of a communication addressed to the Secretary of the Treasury by the Secretary of War, relative to a brass Culverin presented to Congress by General La Fayette.

You are requested to apply to the Superintendent of the Lazaretto near Baltimore for said Culverin and have it transferred to West Point.

I am, sir, your obedient servant,

(Sgd.) A. R. HETZEL,
Captain and Assistant Quartermaster,
In charge of office.

Captain S. R. DUSENBERG, Assistant Quartermaster,
Baltimore.

OFFICIAL:
(Sgd.) I. McDOWELL,
Lieutenant and Adjutant.

114. 6-pdr. bronze gun with handles, cal. 3."8, not finished, French manufacture.

Captured from the English, at Stony Point, July 15, 1779.

In Memorial Hall.

115. 6-pdr. bronze gun with handles, cal. 3."75, French manufacture.

Captured from the English, at Stony Point, July 15, 1779. "La choquante"—"Ultima ratio regum"—"Pluribus nec impar."

In Memorial Hall.

116. 6-pdr. bronze gun with handles, cal. 3."75, French manufacture.

Captured from the English, at Stony Point, July 15, 1779.

In Memorial Hall.

117. 6-pdr. bronze gun with handles, cal. 3."8, French manufacture.

Captured from the English, at Stony Point, July 15, 1779.

In Memorial Hall,

118. 6-pdr. bronze gun with handles, cal. 3."9, French manufacture.

Captured from the English, at Stony Point, July 15, 1779. "L'aurore"—"Ultima ratio regum"—"Pluribus nec impar."

In Memorial Hall.

119. 6-pdr. bronze gun with handles, cal. 3."55, French manufacture.

Captured from the English, at Stony Point, July 15, 1779. "Louis Charles De Bourbon, Comte D'Eu, Duc D'Aumale."

In Memorial Hall.

120. 4-pdr. bronze gun with handles, cal. 3."5, French manufacture.

Captured from the English, at Stony Point, July 15, 1779.

In Memorial Hall.

121. 4-pdr. bronze gun with handles, cal. 3."5, French manufacture.

Captured from the English, at Stony Point, July 15, 1779.

In Memorial Hall.

CONFEDERATE AND EXPERIMENTAL GUNS.

Trophy Guns, Howitzers and Mortars; and Guns, etc., of Historical Interest from the War 1861-1865; and Experimental Guns.

122. 3-inch Bomford and Wade, experimental gun, American.

Pierced with holes to determine pressures at different points of bore.
At Fort Clinton.

123. 6-pdr. Wiard gun, steel, cal. 2."6.

At Fort Clinton.

124. 24-pdr. Wahrendorf's smooth-bore, breech-loading gun, cal. 5."82.

Cast and wrought iron. At Trophy Point.

125. 150-pdr. Armstrong rifled muzzle-loading gun.

Mounted on carriage; captured at Fort Fisher, North Carolina.
At Trophy Point.

126. Confederate rifled steel gun, Sawyer manufacture, cal. 3."68.

At Fort Clinton.

127. 3-inch Confederate cast-iron rifled gun.

At Fort Clinton.

128. 12-pdr. Confederate cast-iron smooth-bore gun, cal. 5."4.

Wrought-iron banded; captured at Cedar Creek, Virginia.
At Fort Clinton.

129. 12-pdr. Confederate bronze gun, smooth-bore. cal. 4."62.

At Trophy Point.

130. 3-inch Brooks Confederate cast and wrought-iron gun.

Parrott imitation; banded; muzzle broken off; captured at Vicksburg, Mississippi. At Fort Clinton.

131. 3-inch Brooks Confederate cast-iron rifled gun.
Parrott imitation, banded with wrought-iron, muzzle broken off; captured at Vicksburg, Mississippi. At Fort Clinton.

132. 6-pdr. Confederate bronze rifled gun, cal. 3.″67.
Struck by projectile on right trunnion. At Trophy Point.

133. 6-pdr. Confederate bronze smooth-bore gun, cal. 3.″7.
Captured along the Mississippi River; "Jeff Davis" marked on base ring; knob of cascable broken off. In Memorial Hall.

134. 12-pdr. Confederate cast iron smooth-bore gun, cal. 4.″62.
At Fort Clinton.

135. 6-pdr. Confederate bronze smooth-bore gun, cal. 3.″7.
Captured along the Mississippi River; "Johnson" marked on base ring; struck on reinforce. In Memorial Hall.

136. 6-pdr. Confederate bronze smooth-bore gun, cal. 3.″7.
Captured along the Mississippi River; struck by a projectile on right trunnion. In Memorial Hall.

137. 6-pdr. Confederate bronze smooth-bore gun, cal. 3.″7.
Captured along the Mississippi River; muzzle broken by a projectile. In Memorial Hall.

138. 6-pdr. Confederate bronze smooth-bore gun, cal. 3.″7.
Captured along the Mississippi River; struck by a projectile on muzzle. At Trophy Point.

139. 12-pdr. Confederate bronze howitzer, cal. 4.″62.
Captured along the Mississippi River; struck by projectiles on muzzle and base ring. At Trophy Point.

140. U. S. Eprouvette mortar and cast-iron bed.
Ball in mortar. At Laboratory Yard.

141. 4.8-inch Brooks cast-iron rifled gun.
Wrought-iron banded; captured along the Mississippi River; muzzle split. At Fort Clinton.

142. 24-pdr. cast-iron rifled gun. Old U. S. manufacture, model 1839, cal. 6."9.

Captured along the Mississippi River; struck on muzzle by a projectile. At Fort Clinton.

143. 24-pdr. cast-iron rifled gun. Old U. S. manufacture, model 1839, cal. 5."9.

Captured along the Mississippi River; knob of cascable broken off. At Fort Clinton.

144. 24-pdr. cast-iron smooth-bore gun, cal. 5."79. Old U. S. model.

Captured along the Mississippi River; muzzle and cascable broken off. At Fort Clinton.

145. 24-pdr. cast-iron smooth-bore gun, cal. 5."9.

Captured along the Mississippi River; struck by a projectile on muzzle. At Fort Clinton.

146. 32-pdr. smooth-bore cast-iron short navy gun, cal. 6."35.

Captured from Confederate gun-boat on Mississippi River; part of muzzle broken off. At Fort Clinton.

147. 7.5-inch Blakely cast-iron rifled gun.

Wrought iron banded; captured at Vicksburg, Mississippi; part of muzzle cut off. This gun is called "*Whistling Dick*," a name given to it by the Union Troops, from the sound of its projectiles passing through the air. At Fort Clinton.

148. 8-inch Blakely rifled gun.

Percussion shell in gun, captured at Fort Morgan, Alabama, and sent to the U. S. Military Academy by Major General Granger; right trunnion broken off. At Trophy Point.

149. 8-inch cast-iron smooth-bore Navy shell gun.

Captured along the Mississippi River. At Fort Clinton.

150. Small brass Confederate muzzle-loading rifle, cal. 2."2.

At Laboratory Yard.

151. Small brass Confederate muzzle-loading rifle, cal. 2."2.
At Laboratory Yard.

152. 3.1-inch Clay, steel or wrought-iron breech-loading smooth-bore gun.
Captured at Danville, Virginia. At Fort Clinton.

153. Colts revolving gun, old model, small calibre.
At Laboratory Yard.

154. Small U. S. smooth-bore cast-iron breech-loading gun, cal. 1."8.
No breech plug. This gun when fired by the inventor, burst, wounding Major Bradford. At Fort Clinton.

155. 10-inch Rodman experimental smooth-bore gun.
This gun fired 2452 rounds solid shot and 362 rounds hollow shot; cascable broken off. At Trophy Point.

156. 10-inch Rodman experimental smooth-bore gun.
This gun fired 2452 rounds hollow shot and 363 rounds solid shot; cascable broken off. At Trophy Point.

157. 24-pdr. cast-iron experimental gun, cal. 5."8.
Exterior 42-pdr.; top of reinforce and cascable burst off at West Point in 1858. At Fort Clinton.

158. 6-pdr. Confederate bronze rifled gun, cal. 3."30.
At Trophy Point.

159. 6-pdr. Confederate bronze rifled gun. cal. 3."30.
At Trophy Point.

160. 24-pdr. muzzle-loading cast-iron gun, cal. 5."82.
English Revolutionary Trophy. At Trophy Point.

161. 30-pdr. Brooks Confederate cast-iron rifled gun.
Wrought-iron bands; captured at Richmond Virginia.
At Fort Clinton.

162. 3-inch U. S. wrought-iron rifled gun.
History. At Fort Clinton.

ORDNANCE OFFICE, WAR DEPARTMENT,
WASHINGTON, November 6, 1865.

Brig. General G. W. CULLUM,
Superintendent Military Academy,
West Point, N. Y.

SIR :

I have the honor to inform you that on the application of Brevet Lieut. Col. P. S. Michie, the Secretary of War has directed that a gun of Elder's Battery "B," 1st U. S. Artillery, be sent to the West Point Museum, and orders have been given that it be sent to you accordingly, from Richmond, Va.

This gun is stated to have fired the last shot previous to the surrender of Lee's Army at Appomatox Court House, and hence the last shot of the Rebellion.

Respectfully, your obedient servant,
(Sgd.) WM. MAYNADIER,
Brevet Brig. General and Acting Chief of Ordnance.

ORDNANCE OFFICE, WAR DEPARTMENT,
WASHINGTON, November 6, 1865.

Captain J. F. WOOD, Acting Ordnance Officer,
Richmond, Va.

SIR :

You will send to Brig. General G. W. Cullum, Superintendent of the Military Academy, West Point, N. Y., a gun, which is reported to be in your charge, and to have been the left piece of Elder's Battery "B," 1st U. S. Artillery, and to be marked with an × on the trunnions.

If you cannot identify the gun, you will call on Brevet Col. P. S. Michie, at the Engineer Office, Richmond, who has knowledge of it.

Respectfully, your obedient servant,
(Sgd.) WM. MAYNADIER,
Brevet Brig. General and Acting Chief of Ordnance.

163. 3-inch Confederate cast-iron rifled gun.

Wrought-iron banded, no trunnions, works on swivel; captured at Richmond, Va. At Fort Clinton.

164. $1\frac{3}{4}$-inch Confederate muzzle-loading cast-iron rifle.

At Laboratory Yard.

165. 12-pdr. cast-iron smooth-bore gun, cal. 4."6.

Found at Fort Richmond by General Delafield, U. S. A.
At Fort Clinton.

166. Confederate State gun, cal. $6\frac{1}{4}''$x$1\frac{1}{2}''$.

Built up of cast and wrought-iron, banded; captured at Richmond, Va., in course of manufacture, maker unknown. At Fort Clinton.

167. 24-pdr. Confederate Coehorn mortar, cast-iron.

At Laboratory Yard.

168. 12-pdr. Confederate Coehorn mortar, cast-iron.

At Laboratory Yard.

169. 4.5-inch Blakely Confederate cast and wrought-iron rifled gun.

Captured at Fort Pulaski, Georgia. At Trophy Point.

170. 4.5-inch Blakely Confederate cast and wrought-iron rifled gun.

Captured at Fort Pulaski, Georgia. At Trophy Point.

171. 42-pdr. U. S. carronade.

Captured at Port Royal Harbor, South Carolina. At Trophy Point.

172. 42-pdr. U. S. carronade.

Captured at Port Royal Harbor, South Carolina. At Trophy Point.

173. 30-pdr. Parrot siege gun.

This gun was used on Morris Island, and was fired 4606 rounds before giving out. The gun was cast at the West Point Foundry in 1863; it was mounted on Morris Island in January, 1864, for the purpose of throwing shell into the city of Charleston; it was placed on a plain modern carriage manufactured at Morris Island. Sixty-nine days elapsed between the first and last discharge. It was fired at an elevation of 40°. In 5 pieces. At Trophy Point.

174. 12-inch U. S. smooth-bore Columbiad gun.

Wrought iron banded. Bomford experimental gun, model 1844.

At Fort Clinton.

175. 10-inch U. S. smooth-bore cast-iron Columbiad gun.

Swell at muzzle. At Fort Clinton.

The Columbiads are a species of sea-coast cannon which combine certain qualities of the gun, howitzer and mortar; in other words they are long chambered pieces. The columbiad was invented by Colonel Bomford, and used in the War of 1812 for firing solid shot. In 1844, the model was changed, by lengthening the bore and increasing the weight of metal to enable it to endure an increased charge of powder, $\frac{1}{6}$ of the weight of the solid shot. Six years

later it was discovered that the pieces thus altered did not possess the requisite strength. In 1858, they were degraded to the rank of shell guns, and their places supplied with pieces of new model. In 1860, Rodman's system of guns was adopted for all sea-coast cannon. After the conversion of a few smooth bores into rifles by the insertion of a tube, the present system of steel breech loading rifles and mortars for the U. S. service has been adopted.

176. 10-inch U. S. smooth-bore cast-iron Columbiad gun, No. 2.

Old pattern, band at muzzle. At Fort Clinton.

177. 8-inch U. S. smooth-bore cast-iron Columbiad gun, No. 1.

Band at muzzle. At Fort Clinton.

178. 100-pdr. U. S. smooth-bore cast-iron Columbiad gun, cal. 9.″1.

Obsolete pattern. At Fort Clinton.

179. 50-pdr. U. S. smooth-bore cast-iron Columbiad gun, cal. 7.″3.

Obsolete pattern. At Fort Clinton.

180. 42-pdr. U. S. service smooth-bore cast-iron Columbiad gun, cal. 6.″85.

Foreign manufacture; marked 1786. At Fort Clinton.

181. 32-pdr. U. S. smooth-bore cast-iron gun, cal. 6.″4.

Swell at muzzle. At Fort Clinton.

182. 12-pdr. smooth-bore cast-iron gun, cal. 4.″63.

Swedish experimental pattern. At Fort Clinton.

183. 6-pdr. smooth-bore cast-iron gun, cal. 3.″66.

Swedish experimental pattern.

184. 12-pdr. U. S. smooth-bore cast-iron howitzer, cal. 4.″62.

Experimental pattern. At Fort Clinton.

185. 24-pdr. U. S. smooth-bore cast-iron howitzer, cal. 5."82.
Experimental pattern. At Fort Clinton.

186. 10-inch U. S. siege mortar, model 1819.
Cast iron. At Fort Clinton.

187. 10-inch U. S. siege mortar, model 1819.
Cast iron. At Fort Clinton.

188. 80-pdr. steel or wrought iron gun, Whitworth.
Manufactured for Confederate Army. The gun was captured on blockade runner near Charleston, S. C., and was used on Morris Island against Fort Sumter by the U. S. Army in 1863.
At Fort Clinton.

189. 7-inch Brooks Confederate cast-iron rifled gun.
Banded; captured at Charleston Harbor, S. C. At Fort Clinton.

190. 10-inch Confederate Columbiad smooth-bore cast-iron gun.
Made after Rodman pattern; captured at Charleston Harbor, S. C.
At Fort Clinton.

191. 6-pdr. U. S. cast-iron smooth-bore gun, cal. 3."6.
Old experimental pattern; model 1812. At Fort Clinton.

192. 6-pdr. bronze rifled gun, cal. 3."82, James experimental field gun.
At Trophy Point.

193. 6-pdr. U. S. bronze rifled gun, cal. 3."85.
By Greenwood, Cincinnati, Ohio. In Memorial Hall.

194. 5-pdr. U. S. bronze gun.
1838 on right trunnion; struck on muzzle by a projectile.
In Memorial Hall.

195. 12-pdr. U. S. field gun, cal. 3."2.
German silver; Hooper's metal. At Trophy Point.

196. 12-pdr. Confederate brass field gun.
At Grant Hall,

197. 12-pdr. Confederate brass field gun.

At Sedgwick's Monument.

198. 12-pdr. Confederate brass field gun.

On road near Chapel.

199. 12-pdr. Confederate brass field gun.

On road near Chapel.

200. 12-pdr. Confederate brass field gun.

South east corner Academic Building.

201. 12-pdr. Confederate brass field gun.

On road near Chapel.

202. 3-inch Confederate cast-iron rifled field gun.

No bands. At Fort Clinton.

203. 6-pdr. Confederate smooth-bore bronze gun, cal. 3."68.

Exterior form of James Rifle; captured at Nashville, Tennessee.

At Trophy Point.

204. 6-pdr. Blakely rifled steel gun, cal. 3."3.

Captured at Saulsbury, North Carolina. At Fort Clinton.

HEADQUARTERS DEPARTMENT OF TENNESSEE,
KNOXVILLE, TENN., September 20, 1865.

Brig. General G. W. CULLUM,
Superintendent U. S. Military Academy,
West Point, N. Y.

DEAR SIR :

I have this day ordered sent to you to be deposited amongst the curiosities at West Point, a gun (if so it can be called), captured by the Cavalry forces under my command in April last at Saulsbury, North Carolina.

I think it had not been fired previous to its having been captured.

I had it tried and the third discharge rendered it unserviceable.

I am, General,
Very respectfully, your obedient servant,
(Sgd.) GEORGE STONEMAN,
Major General, Volunteers.

205. 6-pdr. U. S. bronze field gun.

Capt. Duncan's battery during Mexican War. In Memorial Hall.

206. 6-pdr. U. S. bronze field gun.

Capt. Duncan's battery during Mexican War. In Memorial Hall.

207. 6-pdr. U. S. bronze field gun.
Capt. Duncan's battery during Mexican War. In Memorial Hall.

208. 12-pdr. U. S. field howitzer.
Capt. Duncan's battery during Mexican War. In Memorial Hall.

209. 6-pdr. U. S. bronze field gun.
Capt. Ringgold's battery during Mexican War. In Memorial Hall.

210. 6-pdr. U. S. bronze field gun.
Capt. Ringgold's battery during Mexican War. In Memorial Hall.

211. 6-pdr. U. S. bronze field gun.
Capt. Ringgold's battery during Mexican War. In Memorial Hall.

212. 12-pdr. U. S. bronze field howitzer.
Capt. Ringgold's battery during Mexican War. In Memorial Hall.

213. 12-pdr. English smooth-bore cast-iron carronade, cal. 4.″68.
Old pattern; marked "Fawcett Preston & Co., Engineers, Liverpool, 1862." At Fort Clinton.

214. 10-pdr. U. S. Parrott cast-iron rifled field gun, cal. 2.″9, model 1861.
Banded. At Fort Clinton.

215. 3-inch U. S. Parrott cast-iron rifled gun, model 1863.
Banded. At Fort Clinton.

216. Blakely Confederate steel rifled gun, cal. 3.″7.
Banded; marked "Fawcett Preston & Co., makers, Liverpool, 1861." At Fort Clinton.

217. 12-pdr. U. S. bronze mountain howitzer and carriage.
With sponge and staff. At Laboratory Yard.

218. Slice of gun.
At Laboratory Yard.

219. 3.67-inch Confederate smooth-bore steel or wrought-iron gun.

Trunnions attached to band on gun. At Fort Clinton.

220. 3.45-inch Confederate cast-iron rifled gun.

Banded. At Fort Clinton.

221. 3-inch Confederate cast-iron rifled gun.

Imitation of Parrott's. At Fort Clinton.

222. Wheat's accelerating breech-loading cast-iron gun, cal. 2.″7.

Wrought-iron banded; experimental gun; breech burst at Fort Monroe, Va. This gun was experimented with at West Point, in 1859, under the direction of General Winfield Scott. At Fort Clinton.

223. 24-pdr. Wheat's accelerating experimental breech-loading gun, cal. 5.″85.

Wrought iron banded. At Fort Clinton.

224. 7.3-inch U. S. experimental cast-iron rifled gun.

Wrought-iron bands. At Fort Clinton.

225. 42-pdr. U. S. experimental cast-iron rifled gun, cal. 7″.

Wrought-iron band; on carriage. At Fort Clinton.

226. 3-inch Confederate Armstrong cast-iron rifled gun.

This gun has several re-enforces. At Fort Clinton.

227. 900-pdr. cast-iron rifled gun, cal. 12″.

Wrought-iron band. This gun was mounted by the Confederate Army at Charleston Harbor, South Carolina, and burst in two pieces when firing its first shot at the U. S. Fleet. The explosion is said to have killed forty of the spectators.

In two pieces at Fort Clinton.

228. 3-inch Whitworth Confederate breech-loading gun.

Breech burst in firing inventor's projectile at West Point in 1872.

At Fort Clinton.

229. **18-pdr. James experimental cast-iron rifled gun, cal. 5."3, model 1840.**

At Fort Clinton.

230. **24-pdr. U. S. experimental cast-iron rifled gun, cal. 5."82, model 1839.**

At Fort Clinton.

231. **32-pdr. U. S. experimental cast-iron rifled gun, cal. 6."4, model 1841.**

At Fort Clinton.

232. **8-inch U. S. cast-iron seacoast howitzer, model 1841.**

Marking boundary at Highland Falls.

233. **8-inch U. S. Rodman smooth-bore cast-iron gun.**

On carriage in Fort Clinton.

234. **100-pdr. Parrott rifle, cal. 6."4.**

Banded. On carriage in Fort Clinton.

235. **12-pdr. U. S. cast-iron smooth-bore siege gun, cal. 4."6, model 1840.**

At Fort Clinton.

236. **24-pdr. U. S. cast-iron smooth-bore siege gun, cal. 5."82, model 1840.**

At Fort Clinton.

237. **2-inch small cast-iron gun.**

At Laboratory Yard.

238. **30-pdr. U. S. Parrott siege rifle, cal. 4."2.**

Banded. At Fort Clinton.

239. **24-pdr. U. S. flank defence howitzer, smooth-bore cast-iron, cal. 5."82.**

At Fort Clinton.

240. **8-inch U. S. cast-iron siege howitzer, model 1840.**

At Fort Clinton.

241. 8-inch U. S. cast-iron smooth-bore Columbiad, model 1840.

At Fort Clinton.

242. 42-pdr. U. S. cast-iron smooth-bore sea-coast Columbiad, cal. 7″, model 1840.

At Fort Clinton.

243. 2-inch small wrought-iron Woodruff gun.

At Laboratory Yard.

244. 10-inch U. S. cast-iron mortar and bed, model 1840.

At Fort Clinton.

245. 8-inch U. S. cast-iron mortar and bed, model 1840.

At Fort Clinton.

246. 16-inch U. S. stone mortar, bronze, and bed.

At Fort Clinton.

247. 20-pdr. U. S. Parrott rifle, cal. 3.″67.

Banded. At Fort Clinton.

248. 6-pdr. U. S. bronze gun.

At Trophy Point.

249. 6-pdr. U. S. bronze field gun, cal. 3.″67.

At Officers' Mess.

250. 12-pdr. U. S. bronze field gun with handles, cal. 4.″62.

At Trophy Point.

251. 6-pdr. U. S. cast-iron smooth-bore field gun, cal. 3.″67.

At Fort Clinton.

252. 4.5 inch U. S. Rodman cast-iron siege gun, rifled.

On carriage. At Fort Clinton.

253. 24-pdr. U. S. bronze howitzer with handles, cal. 5.″82.

At Trophy Point.

254. 6-pdr. U. S. bronze field gun.

At Trophy Point.

255. 10-inch U. S. cast-iron siege mortar, model 1819.

At Trophy Point.

256. 10-inch U. S. cast-iron siege mortar, model 1819.

At Trophy Point.

257. 18-pdr. U. S. cast-iron smooth-bore siege gun.

At Hotel.

258. 18-pdr. U. S. cast-iron smooth-bore siege gun.

At Hotel.

259. 18-pdr. U. S. cast-iron smooth-bore siege gun.

At Hotel.

260. 18-pdr. U. S. cast-iron smooth-bore siege gun.

At Library.

261. 18-pdr. U. S. cast-iron smooth-bore siege gun.

At Library.

262. 12-pdr. U. S. cast-iron smooth-bore siege gun.

At Mr. Ward's.

263. 4-pdr. cast-iron smooth-bore gun.

At Laboratory Yard.

WAR DEPARTMENT,
WASHINGTON CITY, July 1st, 1873.

Colonel THOS. H. RUGER,
Superintendent, Military Academy.

SIR:

The Secretary of War directs me to inform you that he has directed the Ordnance Bureau to transfer to the custody of the authorities at West Point, a small iron gun, said to have been the first fired in the cause of the Rebellion, the history of which is described in the enclosed slip.

The Ordnance Bureau will forward it to West Point.

Very respectfully, yours,
(Sgd.) W. T. BARNARD,
Acting Chief Clerk.

OFFICIAL COPY:
(Sgd.) ROBERT H. HALL,
Captain 10th Infantry, Adjutant.

HISTORY.

[EXTRACT.]

HEADQUARTERS DEPARTMENT OF MISSISSIPPI,

VICKSBURG, MISS., July 5, 1866.

To the Hon. EDWIN M. STANTON,
Secretary of War.

SIR:

I have the honor, in compliance with authority from you of May 16th, to forward, in charge of a detachment of the 15th U. S. Infantry, a small four pound cannon, formerly the property of the City of Vicksburg, with the following history of the gun as furnished to me by a citizen of Vicksburg, Miss.:

"This was the first gun fired in the cause of the Rebellion. I fired it myself at the steamer passing Vicksburg bound for New Orleans, supposed to have arms and ammunition on board belonging to the United States. This firing took place several days before any guns were fired at the United States forts or troops either at Charleston or Pensacola."

I have the honor to request that it may be placed among the relics of the Rebellion preserved at Washington * * *

I have the honor to be, very respectfully,
Your obedient servant,
(Sgd.) TH. J. WOOD,
Major General Volunteers Commanding.

OFFICIAL:
(Sgd.) ROBERT H. HALL,
Captain 10th Infantry, Adjutant.

RAPID FIRE GUNS.

264. 6-pdr. Driggs-Schroeder rapid fire gun.

A rapid fire gun differs from a machine gun in having a larger calibre, loading by hand, having one barrel and an automatic means of checking recoil and returning the gun to its firing position. It uses metallic ammunition, and rapidity of fire is obtained by the use of a simple breech-mechanism, which works quickly, cocking the firing-pin and extracting the empty cartridge case in the act of opening.

The Driggs-Schroeder gun is an American invention and the breech system combines the rotating and the sliding movements, but its distinguishing feature is that the breech-slot does not extend through the top of the breech and the block rests in grooves on the top and sides of the slot. This gives greater strength, protects all the working parts, and enables the weights of these parts to be reduced, thereby facilitating the operations of opening and closing the breech. In opening, the breech-block drops down and then rotates to the rear, and in closing these motions are reversed.

The firing mechanism is in the breech-block.

265. 3-pdr. Nordenfelt rapid fire gun.

The breech mechanism in this system combines the sliding and rotating motions so as to avoid guillotining the cartridge in forcing it home.

The breech block consists of two parts, the front part or block proper and the wedge-shaped rear part.

The front block rotates around a shaft which passes through the breech, while the rear part or wedge has first a vertical down sliding motion along the back of the front part until it reaches a certain position, when both parts rotate backward around the shaft. The firing mechanism is in the block, arranged so the piece can not be fired until the block is home. The extractor and ejector are in front of the block and operated by its opening.

266. 3-pdr. Hotchkiss rapid fire gun.

The body of the gun consists of a tube and jacket united by shrinkage. The jacket extends to the rear of the tube and is slotted vertically to receive the breech block. The breech-mechanism consists of a wedge-shaped block, which rises and falls in a vertical

direction in the slot at the rear end of the jacket, instead of moving horizontally as in the Krupp. Its front surface is perpendicular to the axis of the bore, and its rear surface inclined to that axis, so that the block in rising, gradually moves forward towards the barrel. The block contains the firing mechanism.

267. 1.65-inch Hotchkiss breech-loading mountain gun.

This has a breech-block sliding at right angles to the axis of the bore, after the manner of the later Krupp guns. It is locked when closed, by a sectional screw within the block. Used in operations in a very rough, mountainous country, impassible to wheeled vehicles, as it can be packed on mule back or carried by two men. Calibre, 1.65; number of grooves, 12; depth, .075 inch; width, .30; weight of gun, 110 pounds; charge of powder, 269.5 grains; weight of shell loaded, 2 pounds 10 ounces. Mounted on steel carriage, to which shafts or a pole can be attached for hauling by one or two animals. The powder is contained in a metallic cartridge case, either of wrapped metal or with a soldered joint. Through the centre of the iron head of this case is a flame hole, closed by an internal valve, which is lifted by the flame from the friction primer, but is closed by the pressure of the gas within the bore when the cartridge is fired. A wide band of thin brass encircles the projectile, and this is forced into the rifling to give rotation. Above the breech-block, in the body of the gun, is a sliding extractor, worked by an oblique groove in the upper surface of the breech-block, in which a stud on the lower surface of the extractor is engaged.

MACHINE GUNS.

268. 1.5-inch Hotchkiss breech-loading revolving cannon.

The barrels are fixed on a revolving frame, as in the Gatling gun, and they are worked by turning a crank at the side. The crank shaft carries a driving worm running half round the circumference, so that the barrels revolve only during half a turn of the crank. They therefore have an intermittent motion round the axle. Cartridges fed from a hopper fall successively in front of the loading bolt, which, while a barrel is stationary in front of it, pushes a cartridge in. The revolution of the barrels brings them successively opposite a solid part of the breech, which supports the base of the cartridge. During the pause of the barrel here, the cartridge is exploded by a firing-pin working through the breech. The shell is carried on down opposite an extractor which draws it out and lets it fall to the ground. The operation of loading, firing, and extracting are performed in different barrels at the same time, during the intermittent pauses, by a single set of parts answering for all the barrels in succession, This five barrel gun, calibre 1½ inches, fires 150 shots a minute, projectiles weighing 1½ pounds.

269. Gorgas Confederate cast-iron smooth-bore gun, calibre 1.25-inches.

This gun has a single barrel fastened by an eye and wedge key to a heavy cast iron horizontal plate. This plate extends under part of the barrel, is circular in rear of the barrel, and has an extension to the rear; the rear part contains gearing which is operated by a hand lever. This gearing rotates a horizontal ring contained in the circular portion of the horizontal plate; this horizontal ring has 18 copper lined muzzle loading chambers on the outer circumference, and 18 corresponding percussion cap nipples on the inner circumference; under these nipples and on the ring are 18 cams; these cams act successively on a lever which withdraws a hammer and compresses a firing spring when the ring is rotated from left to right; the hammer is released as it reaches the end of the cam. The trunnion piece is pivoted underneath the front of the horizontal plate. There is a lever and loading piston on the right of the barrel, and attached to the horizontal plate, by which the charges are rammed home in succession as the ring is rotated and the chambers are about to be seated behind the barrel.

270. 1.5-inch Williams Confederate machine gun.

This corresponds to the class of quick-loaders now exemplified by the Hotchkiss rapid-firing guns, the latter, however, having the great advantage of using self-primed metallic-case ammunition, to which the Williams gun might readily be adapted for use with moderate calibre. The Williams gun has a breech-block moving back and forth in the line of the barrel. It is operated by turning a crank on the right side. Upon the crank shaft, which is perpendicular to the axis of the bore, is an eccentric which alternately withdraws and pushes in the breech-block to open and close the breech. A worm at the end of the shaft works on the end of the lever at the left side of the piece, the lever having a hammer at the other end. When the end of the worm is reached, the hammer thus raised is released and forced by a spring against a nipple on which a percussion-cap is placed. The mechanism is so arranged that just after the breech-block is closed the hammer falls and fires the piece. The breech-block is supported against the shock of the discharge by the eccentric, which transfers the strain to the shaft upon which it revolves. The gas-check used in the Williams gun closely resembles the Freyre gas-check used in the new U. S. breech-loading field-gun. The inventor, Mr. D. R. Williams, of Covington, Kentucky, took the gun South at the beginning of the Civil War, and it was adopted by the Confederate Government. Some of the batteries are said to have done much execution. The inventor claims to have fired 65 shots per minute.

271. Vandenberg Confederate volley gun, 85 barrels, rifled, cal. .50″, English manufacture.

Marked number 4, Robinson and Cotton, London.

Captured by the Cavalry Forces, under General Stoneman, U. S. A., at Saulsbury, North Carolina, April, 1865.

It consists of 85 barrels, grouped in a cylindrical casing of bronze. A breech-piece, with corresponding muzzle loading cartridge-chambers, copper lined, fits in rear, this piece being attached to a hinge and slide, and having an independent screw-block at the outer end to screw into the casing from the rear. After firing the block had to be unscrewed, pulled out, and swung down. The chambers were then separately reloaded, the breech closed, and all the charges fired at once by a percussion cap in rear. The copper-

lining of the chambers projects a little from the block to fit into the barrels and serve as gas-check.

272. Gardner machine gun, cal. .45″, model 1879.

This gun has two barrels side by side to be fired alternately. A bolt is placed in rear of each barrel, and these bolts are actuated by cams on a horizontal shaft perpendicular to them. This shaft is turned by a handle at the side, and the cams are so placed as to draw out one bolt while pushing in the other, releasing a firing-pin on each bolt when the corresponding barrel is loaded. The feed case, similar to that on the Lowell, is double, containing a row of cartridges for each barrel, a swinging plate closing openings below alternately. The barrels are inclosed in a hollow casing of bronze. This is an excellent gun, simple and effective.

273. Maxim automatic machine gun, cal. .45″.

This gun, by the effect of its own recoil over a space of only three-quarters of an inch, compresses a spring, and this, when the pressure is released, operates mechanism which ejects the empty shell, draws a new cartridge to the front of the bolt, forces it into the barrel and fires it automatically, this operation continuing as long as cartridges are supplied. The cartridges are placed in pockets on a belt holding 333 cartridges, and several belts can be fastened end to end. The end of the belt is introduced into the breech-casing from the side, and the belt is drawn in as the gun is fired, the breech-bolt passing through the sockets and pushing the cartridges into the barrel. At the same time water is automatically injected into a casing around the barrel to keep it cool. Six hundred shots per minute can be fired. This is an American invention developed abroad.

274. Gatling gun, short barrel, mounted on tripod, cal. .45″, model 1876.

The object of a machine gun is to deliver a rapid and continuous fire and thereby enable a few men to produce the same effect as a larger number armed with the ordinary rifle. Owing to the great volume of fire delivered by them, they may be employed at decisive moments of the attack, and to defend defiles, ditches of permanent works, and for their moral effect in street fighting. In the Naval Service they are mounted in the tops, to sweep the enemy's

decks, and drive the cannoneers from their guns, and to repel boarders. These guns are mounted on wheeled carriages, and transported like artillery. They therefore appear naturally to belong to that arm of the service. But as they generally fire small-arm ammunition, they are unable to cope with field-artillery at the fighting range of the latter. This limits the use of machine guns in the attack to the infantry arm, and it is generally considered that for purposes of attack they are inferior to infantry, as they do not possess its mobility.

275. Gatling gun, cal. .45″, model 1883; Accles feed drum and Bruce feed.

The barrels are fixed on a revolving frame, parallel to its axle, and they are revolved by turning a crank which can be placed at the side or rear of the breech-casing at pleasure. The frame projects to the rear of the barrels in the form of a drum, longitudinal slots in the outer surface holding opposite each barrel a sliding breech-bolt with a spring firing pin. A curved lip on the interior of the stationary breech-casing engages the bolts, and wedges them forward and back as the barrels revolve. When a bolt is well drawn back, its firing-pin catches in another lip, which holds it back as the bolt moves forward. This compresses the firing-spring, and the revolution carries the pin to the end of the lip, where it is released when the bolt is pushed home, and so the cartridge is fired. Cartridges fall successively in rear of the barrels through a mouth in the casing over the position of a barrel when the corresponding bolt is drawn back. By the forward and back motion of the bolts, as the barrels revolve, first the cartridges are pushed into the barrels, and then the empty shells are drawn out, a spring hook, which projects beyond the front of each bolt, acting as extractor. The operations of loading, firing, and extracting the shells are going on in different barrels at the same time while the barrels are revolving. The gun has a universal pivot mounting, which allows it to be turned in any direction by the pointing lever. Clamps secure it in position. Cartridges are supplied to the gun by means of the Bruce feed frame, or by the Accles feed drum, the old straight feed cases being practically abandoned.

The Bruce Feed.—In this, a vertical frame fitting over the mouth holds a swinging plate, on the front face of which are two channels with undercut sides to catch the flanges of the cartridges. This

plate can be shifted so as to bring these channels alternately over the mouth and allow the columns of cartridges to fall down by gravity. The ordinary paper boxes in which the cartridges come from the arsenals, holding twenty cartridges in two rows, can be used as in the Gardner gun for filling the feed channels. The cover being removed from the box, the flanges of all the cartridges can be slid into the channels, and pulling the box forward leaves the cartridges behind.

The Accles Feed Drum.—This holds the cartridges in spiral guides within, a series of radial arms revolving together and pushing the cartridges towards the orifice. Projections on the revolving frame of the gun engage the ends of these arms and turn them by a positive motion, without the use of an actuating spring in the drum. The drums hold about one hundred cartridges, and with this attachment shots can be fired at the rate of 1,200 per minute.

The positive action of the feed allows it to be used in firing at great angles of elevation or depression.

276. Gatling gun, cal. .30″, model 1895, with improved Bruce feed.

277. Gatling gun, cal. .45″, model 1876, Tin Gravity feed.

278. Gatling gun, cal. .50″, model 1865, metallic ammunition, Tin feed.

279. Gatling gun, cal. .58″, model 1864.

280. Guthrie and Lee machine gun, for field service, two barrels, cal. .70″.

Two barrels are fixed to the frame. At right angles to their length travels a breech-block, to which by the action of the hand-lever a horizontal reciprocal motion is given. By this movement chambers in the block are brought first opposite the barrels, and then opposite loading troughs by the side of the barrels and in front of the block. Cartridges are placed singly by hand in these troughs, and pistons force the cartridges automatically into the chamber. When the chambers come opposite the barrels, the charge is fired by a concealed lock. The loading troughs and pistons are interesting pieces of mechanism. No record of this gun is accessible.

281. Union repeating machine gun, two barrels, rifled, cal. .58″.

Marked E. Nugent. Short, muzzle-loading barrels, or chamber-piece, with an axial nipple at the rear, are used to hold cartridges. A number of these are loaded and capped, and fed by means of a hopper upon a fluted cylinder, which revolves and brings the charges in succession in rear of the long barrel, pausing long enough to allow the charge to be fired. A wedge-shaped block, moving vertically in rear, forces each small chamber-piece in turn forward against the rear of the barrel to prevent escape of gas, and serves to support the recoil. But one lock is used, working through a slot in the block. After firing, the chamber-pieces are carried round to an opening which allows them to fall out. They can be reloaded and used again indefinitely. A crank at the side operates the breech-mechanism. This gun was used at the siege of Petersburg.

282. Farwell machine gun, cal. .45″, four barrels.

283. Billinghurst and Requa breech-loading battery rifled gun, cal. .52″, twenty-five barrels.

For simultaneous discharge of twenty-five barrels. The barrels are placed side by side in the same plane, and loaded successively at the breech with paper ammunition. The breech action gives a firm support against the shock of discharge. All the barrels are closed by a single sliding plate, which is supported by another plate hinged to its rear edge, the free edge resting against a shoulder on the frame of the gun when the breech-plate is pushed forward. The hinged plate is operated by a lever working in a vertical plane parallel to the line of fire. The lever is hinged to the frame at the rear end of the hinged plate, so that pulling the lever backward raises the plate over the supporting shoulder, and pulls it to the rear. The breech-plate and hinged plate constitute practically a broad breech-block and locking cam, like that used in the Springfield breech-loading rifle, except that the breech-plate, instead of being hinged to the barrels at the front, like the breech-block of the Springfield, is made to slide backward and forward. The gun failed with paper cartridges for want of a proper gas-check, but for metallic case-cartridges the breech system would answer for guns of the type of the Nordenfelt. The barrels can be brought together at the muzzle, or spread apart, as desired, by a lever below. Used at the Siege of Fort Wagner, South Carolina.

ENGLISH REVOLUTIONARY MORTARS.

284. English revolutionary bronze mortar, cal. 5."90.
Surrendered by the English at Saratoga, October 17, 1777.

285. English revolutionary bronze mortar, cal. 4¾".*
Taken from the English at Stony Point, July 16, 1779.

286. English revolutionary bronze mortar, cal. 4¾".*
Taken from the English at Stony Point, July 16, 1779.

287. English revolutionary bronze mortar, cal. 4¾".*
Surrendered by the English at Saratoga, October 17, 1777.

288. English revolutionary bronze mortar, cal. 4¾".*
Surrendered by the English at Saratoga, October 17, 1777.

289. English revolutionary small brass howitzer, cal. 2¾".*
Marked. D. King, Germantown.

290. English revolutionary small brass howitzer, cal. 2¾".*
Marked. D. King, Germantown.

291. English revolutionary small brass howitzer, cal. 2¾".*
Marked. D. King, Germantown.

292. Small brass gun.*
Used by Colonel Benton for experimental purposes.

* In Museum with Mexican Mine.

SECTION II.

This section contains interesting specimens of the studded, flanged and expanding systems of rotating devices for rifled projectiles, as well as of the modern compression system, as illustrated in the case of the service projectiles on wall near the south door. The exterior diameter of the rotating band of the latter projectiles is slightly greater than the diameter of the bore measured from the bottom of the grooves, so that these copper bands are compressed or forced into the grooves in firing.

The extensive collection of Confederate projectiles was a gift to the Academy from General Abbot, U. S. Army.

Some Confederate torpedoes, illustrating the state of submarine mining during the period of the Civil War, are shown in this Section.

PROJECTILES.

400. 4-inch shot.

Made at West Point foundry for Armstrong B. L. gun; two lead bands on body.

401. Lindner B. L. 3.4-inch shot.

Two lead bands taken off, shot fired.

402. Lindner B. L. 3.4-inch shot fired.

Two lead bands on shot.

403. French shell.

From the battle field of Solferino; lead studs.

404. Sigourney shell.

American, iron flanged.

405. Krupp 3-inch B. L. field shell.

Body covered with lead.

406. B. L. 3.6-inch shot fired.

Copper wire bands, supposed to be Cochran shot.

407. 4.2-inch Butler shot, 30-pdr., expanding system.

The Butler shot, invented by Major J. G. Butler, Ordnance Department, has for sabot a soft metal ring screwed on the base; the ring having a groove in the rear surface, forming a narrow lip on the outer edge, and a wider one on the inner. The powder gases acting on the outer lip force it out into the rifling to give rotation to the shot, and check the flow of gas past the shot, at the same time tending to press the inner lip more firmly on the shot, and prevent stripping of the sabot. It was the first base sabot fully answering the conditions for muzzle loading rifles. This system is called the *expanding* system.

408. Patterson 2.4-inch B. L. shot.

Two leather bands on body; 5 diagonal ribs on body of shot; leather bands missing.

409. Lindner B. L. 3.4-inch shot.

Lead bands, with webbing around body.

410. Confederate B. L. 3.5-inch shot.
Rope band around body.

411. Confederate B. L. 3-inch shot.
Three bands; rope on body.

412. Sutcliffe B. L. 9-inch shot, chilled head.
Imitation of German shot; lead body band full length of body, with six raised rings. Bolt with ring in it, in base of shot (Krupp cored shot, old model).

413. Moffatt B. L. 3-inch shell.
Imitation of German shell; lead band full length of body, with four raised rings. Schenkle fuze in point of shell.

414. Mann 8.3-inch B. L. shot.
Two lead bands around body.

415. Mann 3-inch B. L. shot.
Two lead bands around body.

416. Butler B. L. 3-inch shell.
For Sutcliffe gun.

417. 4.2-inch Eureka shot, 30-pdr.
Brass sabot ring; shot has conical base, on which cup expands under gas pressure; cup is held by central bolt in base of shot.

418. Butler B. L. 12-inch shot.
For Thompson gun; weight 595 lbs. At Ordnance Laboratory.

419. Stafford steel faced 6.4-inch shot.
Brass sabot; cord between brass sabot and shot. Shot held by two rivets from turning. Point or head of shot is a flat end of steel.

420. Stafford steel sub-calibre 6.4-inch shot.
With brass sabot. Body of shot is a 4.5-inch steel hollow cylinder covered with wood; to the base of this is attached a steel base plate which has a lug in rear, and over this the brass sabot fits, being held in place by a bolt which passes through the plate into the body of the shot; radially opposite the bolt is a dowel in the brass plate, fitting into a hole in the body of shot.

421. Stafford steel faced 6.4-inch shot.

Wrought-iron band around air cavities; base band not on; rotating ring missing; four diagonal cavities near head. Head of shot is a flat hexagon of steel.

422. Confederate 10-inch shot.

Copper band on base; flat head 10″ diameter, body 7″ diameter, base 10″ diameter. Base of shot has large conical cavity.

423. Confederate 10-inch shot.

Brass ring on shot, ring on middle of shot; shot tapers from band to each end. Band is grooved in rear making an expanding lip.

424. Steel 12-inch shot.

Lead band at base. At Ordnance Laboratory.

425. Krupp B. L. field shell.

Body covered with lead. At Ordnance Laboratory.

426. Wooden model of shot for 100-ton Armstrong Italian gun.

Weight 2110 lbs.

427. Laidley shot fired.

Base fragment.

428. Confederate Blakely 8-inch shot.

From Fort Fisher, N. C.; iron flanged, weight 168 lbs., three diagonal ribs on body of shot, flat head and base. This system was devised by Commander Scott, R. N., and adopted by Blakely for his large calibre. The gun was rifled for these ribs.

429. Confederate 8-inch wrought-iron shot.

Weight 177 lbs., flat head, expanding lip formed by groove in base of shot.

430. Confederate Blakely 8-inch shot.

Weight 145 lbs., from Fort Fisher.

431. Confederate 8-inch shell.

Copper ratchet sabot, weight 117 lbs., copper ratchet sabot held by iron washer and central bolt in base of shell. Brass ring in point to receive fuze plug; brass fuze plug in point of shell.

432. Confederate 8-inch shot.

Copper ratchet sabot, Brooke, weight 157 lbs., copper ratchet sabot held by iron bolt in center of base of shot.

433. Confederate 8-inch shell.

Weight 145 lbs.; fired often from Howlett's battery, sometimes with copper and sometimes with brass rings, the latter evidently Parrott projectiles, part of ring missing. Copper ring one half cut away to show construction.

434. Confederate 8-inch shot.

Weight 153 lbs., fired from Howlett's battery, copper ring. Ring partially cut away to show construction.

435. Confederate 8-inch shell.

Weight 131 lbs., found at Tredegar Works, copper ring. Copper ring partially cut away to show construction.

436. Confederate 7-inch shot.

Weight 116 lbs., wrought-iron rings, found at Naval Laboratory; wrought-iron base ring fastened by three dowels to base of shot, partially cut away to show construction; also a wrought-iron ring on body near head.

437. Confederate 8-inch shot.

Weight 157 lbs., Armstrong shot from Fort Fisher.

438. Confederate 7-inch shot.

Weight 136 lbs., had rope lashing between copper plate and shot. Found at Naval Laboratory; paper pasted on it contained the following notes:—

"Steel banded shot (134 lbs.), to be fired from VIII inch rifled guns of 15000 lbs. weight, against iron clad ships with a charge of 18 lbs. of powder. N. H. Van Zandt, Lieut. in C. S. Navy, Chief of Bureau, Ord. and Fleet, Richmond." Steel plate on point of shot, part of shot is broken away under plate, copper plate has three copper dowels which fit in holes in base of shot, and plate is fastened by a bolt in center of base of shot.

439. Confederate 7-inch shell.

Weight 92 lbs., copper plate on base, copper plate has three dowels which fit in holes in base of shell, plate is fastened by a bolt screwed in center of base of shell, fuze hole in point of shell.

440. Confederate 7-inch shot.

Weight 120 lbs., brass ratchet sabot weighing 8 lbs., secured by bolt screwed in center of base of shot.

441. Confederate 7-inch case shot.

Weight 91 lbs. Brooke, copper ratchet sabot, time fuze with double plug to allow insertion of balls. No sabot attached to projectile, fuze plug brass. Ratchet sabot missing, point of shot has two screw plugs, one to facilitate loading, the other for holding time fuze.

442. Confederate 7-inch wrought-iron fired shot.

From Confederate Fleet in James River, weight 120 lbs. P. I. W. marked on expanding lip.

443. Confederate 7-inch shell.

Copper ratchet sabot. One sample found in Naval Laboratory marked Anderson rifle, weight 95.5 lbs., sabot missing.

444. Confederate Whitworth 3-inch shot.

Weight 13.3 lbs.

445. Confederate 7-inch shell.

Weight 100 lbs.; struck sole of embrasure in Fort Brady, disabled gun carriage, pierced through end of magazine and lodged in a hut without losing the copper ratchet sabot. Sabot missing and bolt which held it is broken off.

446. Confederate 7-inch wrought-iron shot.

Found in Fort Fisher, weight 98 lbs., three sided prismatic point; expanding lip base.

447. Confederate 7-inch case shot.

Ratchet sabot with iron washers, copper fuze plug with leather washer, and tin tube soldered to plug for bursting charge, weight 94 lbs.

448. Confederate 7-inch shot.

Weight 95 lbs., copper plate, rope lashing between plate and shot, flat head; base plate has three dowels seated in recesses in base of shot and held by central bolt. No rope between plate and shot.

449. Confederate 7-inch shell.
Weight 91 lbs., copper ring, fired, part of ring broken away to show construction.

450. Confederate 7-inch shell.
In two pieces, weight 169 lbs., shell cut in half to show construction, found at Naval Laboratory, copper ratchet sabot. Sabot held by central bolt; fuze hole in side of shell.

451. Confederate 6.4-inch shell.
Weight 59 lbs., wrought-iron cap ring, brass ring to receive fuze plug, shell evidently cast over wrought-iron ring.

452. Confederate 3-inch shot.
Weight 8 lbs., sabot missing, lead body band.

453. Confederate 7-inch shell.
Weight 73 lbs., fired, copper ratchet sabot; sabot fastened by central bolt in base.

454. Sigourney shell.
American, iron flanged.

455. Confederate 7-inch shell.
Weight 110 lbs., Whitworth, from Fort Fisher.

456. Confederate 3-inch shell.
Weight 9.5 lbs., Whitworth.

457. Confederate 7-inch shell.
Weight 73 lbs., copper ratchet sabot held by central bolt in base.

458. Confederate 3-inch shell.
Weight 9.3 lbs., lead body band missing, body made of two parts.

459. Confederate 6.4-inch shell.
Weight 58 lbs., wrought iron cup, part of base of shell is cut away to show construction. Wrought iron cup or ring is put on in casting shell.

460. Confederate 6.4-inch shot.
Weight 91 lbs., copper plate, had tarred rope between copper plate and shell; copper plate sabot with three dowels seated in recesses in base of shot and held by central bolt in base of shot.

461. Confederate 7-inch shell.
Weight 111 lbs., lead sabot, one half of sabot cut away to show construction.

462. Confederate 4.2-inch shell.
Weight 25 lbs., copper ratchet sabot held by central bolt in base, brass fuze plug with leather washer in point of shell to receive paper fuze.

463. Confederate 4.2-inch shell.
Weight 24.5 lbs., fired, copper ratchet sabot held by central bolt; bolt is broken off and sabot is loose, rifling marks shown on sabot.

464. Confederate 4.2-inch shell.
Weight 25 lbs., copper ring missing.

465. Confederate 4.2-inch shell.
Weight 26 lbs., wrought iron cup, fired.

466. Confederate 1.7-inch shot.
Weight 1.1 lb., copper ring missing. In glass case.

467. Confederate 2.3-inch shot.
Weight 6.4 lbs., Whitworth.

468. Confederate 2.3-inch shell.
Weight 3 lbs., copper plate on base has four holes in it, three for dowels in base of shell and one for bolt in center of base on which nut screws to fasten plate, copper fuze plug in point.

469. Confederate 4.2-inch shell.
Weight 26 lbs., copper ring, fired, part of ring cut away to show construction.

470. Confederate 4.2-inch shell.
Weight 25.5 lbs., copper ring missing.

471. Confederate 4.2-inch shell.
Weight 25 lbs., copper ring, fired, part of ring cut away to show construction.

472. Confederate 4.2-inch shell.
Weight 24.5 lbs., papier-maché sabot missing.

473. Confederate 4.5-inch solid wrought-iron shot.

Weight 40.5 lbs., fired. For use against iron clads. Expanding lip in base, mark of rifling on expanding lip.

474. Confederate 3-inch shell.

Weight 8 lbs., fired, wrought-iron cup or ring inserted in casting shell, part of base of shell cut away to show construction.

475. Confederate 3-inch shell.

Weight 10 lbs., fired, wrought-iron cup or ring inserted in base of shell when cast, part of base of shell and cup cut away to show construction.

476. Confederate 3.6-inch shell.

Weight 14.5 lbs., fired, copper ring or cup and base of shell partly cut away to show construction.

477. Confederate 3.2-inch shell.

Weight 28 lbs., fired, copper ring, part of ring cut away to show construction; copper fuze plug with leather washer in point of shell.

478. Confederate 3.67-inch shell.

Weight 17.7 lbs., wrought-iron cup, fired, part of base of shell cut away to show construction; brass fuze plug in shell.

479. Sigourney shot.

American, iron flanged.

480. Confederate 2.8-inch shell.

Weight 8 lbs., fired, copper ring, copper fuze plug in point of shell.

481. Confederate 2.8-inch shell.

Weight 9 lbs., fired, copper cup ring, part of base of shell cut away to show construction, and ring split and bent open. Marks from rifling on ring.

482. Confederate 4.5-inch shot.

Weight 32 lbs., fired, copper plate missing, three holes for dowels of base plate and central hole for bolt to fasten plate in base of shot.

483. Confederate 3.5-inch shell.

Weight 14.5 lbs., lead base band sabot, six grooves on interior of shell evidently for weakening shell, part of lead band cut away to show construction.

484. Confederate 3.4-inch shell.

Weight 11.5 lbs., lead sabot missing.

485. Confederate 3-inch shell.

Weight 8 lbs., lead fuze plug, fired.

486. Confederate 3-inch shell.

Weight 10 lbs., sixty-three encased fragments, six copper studs, three rows, two in each row. Bursting charge contained in central tube, one half of shell cut away to show construction.

487. Confederate 3-inch shell.

Weight 7 lbs., copper cup ring, rope lashing between ring and shell, wooden fuze plug in shell.

488. U. S. Ordnance shell.

Fired.

489. Confederate 3-inch B. L. shell.

Weight 12.3 lbs., Armstrong, lead body and band sabot, lead coated body and base, five circumferential ribs on body of shell to hold lead coating, one half of lead cut away to show construction, lead fuze plug in point of shell.

490. Confederate 3-inch shell.

Weight 10 lbs., copper ring on base, one half of ring cut away to show construction.

491. Confederate 3-inch shell.

Weight 6.7 lbs., fired, copper cup ring on base. Base of shell and ring partly cut away to show construction.

492. Confederate 3.4-inch shell.

Weight 9.5 lbs., fired, wire and lead band. Wire wound over body and cup base and over this the lead expanding band was cast, evidently to prevent stripping. Marks from rifling on band and band partly stripped thus showing wire; three longitudinal grooves in body to allow flame to pass over and ignite time fuze.

493. Confederate 3.3-inch blind shell.

Weight 11.5 lbs., filled with black sand and permanently closed by copper plug, lead sabot; four longitudinal ribs on body.

494. Ritner and Day lead 5-inch shot.

Fired, ogival head. Marks from rifling on shot. Marks on body M. A. W. P.

495. Ritner and Day lead 5-inch shot.

Fired through 4½ inches wrought-iron plate.

496. Ritner and Day lead 5-inch shot.

For piercing wrought-iron plate. A cylinder 5 inches in diameter, 4 inches long with flat ends, cylindrical body covered with sheet tin. Marked Ritner & Day on base.

497. Confederate 4-inch shot.

Pierced all over with holes; small bolt with holes in it in base, two grooves around body, thirteen holes in base, twenty-three holes in head, sixty holes in body and one hole from point through base, in all ninety-seven holes.

498. Confederate 3.4-inch shrapnel case shot.

Cut open to show construction, each segment divided into six pieces. Brass fuze with percussion cap plunger in it in point of shot, lead band extending one half length of projectile; ten longitudinal segments compose an inner wall, bursting charge contained in center of this.

499. Confederate percussion encased 3.67-inch shell.

500. Confederate percussion encased 3.67-inch shell.

501. Confederate percussion encased 3.67-inch shell.

Base screwed on body, shell with four percussion nipples on head; inside has two longitudinal grooves fitting two ribs on inside of main shell, to keep inner shell point forward; also hole in point of inner shell.

502. Confederate flanged 3.67-inch shell.

Six diagonal ratchet flanges on body, brass percussion cap plunger fuze in point. Plunger is missing.

503. Confederate flanged 4.2-inch percussion shell.
Six diagonal ratchet flanges on body, no fuze in point.

504. Stafford cylindrical 6.4-inch shell.
Brass cup ring at base, seated over a central stud on base of shell and held firm by a bolt. Base of shell conical where ring is seated for ring to expand upon.

505. Stafford 5-inch shot flanged in front.
Brass cup ring on base, four diagonal ribs or flanges on body near head, slender body, separate base held by key dowel from turning on body. Brass cup ring seated over central stud on base and held from turning by dowel or rivet. Base conical where ring is seated.

506. Stafford 5-inch shell.
Brass band or wheel in front, brass cup at base, brass wheel with three spokes on body near head, slender body with separate base. Brass ring seated over central lug on base and held by two rivets, base conical where ring is seated.

507. Brooke 6.4-inch wrought-iron long shot.
Not finished.

508. Parrott 6.4-inch chilled head shot, fired.
Head bulged out and split, ring missing, flat plate or disk on head.

509. Brooke 6.4-inch wrought-iron shot, fired.
Marks from rifling on expanding lip; base and head flattened out.

510. 13-inch steel shot.
Weight 289 lbs. for 13-inch M. L. Seacoast Mortar.
At Laboratory Yard.

511. Unknown 4.62-inch shell.
Copper ratchet sabot held by central bolt in base, copper fuze plug in point.

512. Unknown 3.6-inch shell, fired.
Wrought-iron body band, Hotchkiss system, filled with gravel and brown sand, twelve small holes in base evidently to assist in expanding the band.

513. Absterdam 3-inch shot.

Brass ring with six small cuts in it on base, brass fuze plug in point.

514. Spherical 5.8-inch glass shot.

515. Elongated 4.62-inch glass shot.

516. Elongated 4.62-inch glass shell.

517. Sawyer shell.

Flanged, six rectangular flanges or ribs to fit in corresponding grooves in bore. Entire surface of projectile covered with a coating of lead and brass foil to soften contact with surface of bore, soft metal at corner of base expanded into grooves.

518. Sawyer shell.

Flanged, six rectangular flanges or ribs to fit in corresponding grooves in bore. Entire surface of projectile covered with a coating of lead and brass to soften contact with surface of bore, soft metal at corner of base expanded into grooves.

519. Sawyer shell.

Flanged, fired and burst open.

520. Three fragments of wrought-iron projectile.

521. U. S. 3.2-inch B. L. case shot.

Copper band, brass head for Flagler combination fuze.

522. U. S. 8-inch Schenkl shell.

Papier-maché sabot missing.

523. U. S. Parrott 8-inch shot.

Chilled head, brass band on base, flat plate or disk on point.

524. U. S. Parrott 6.4-inch long shell.

Weight 95 lbs., brass ring on base, fired. Part of band cut away to show construction. Stamped April 11, 1861, on band.

525. Confederate 7-inch shot.

Weight 122 lbs., copper plate, had rope lashing between plate and shot. Copper plate has three dowels seated in holes in base of shot and is fastened by a central bolt screwed in base.

526. Confederate 7-inch wrought-iron shot.

Dowelled copper plate at base. Copper plate has three dowels seated in holes in base of shot and is fastened by a central bolt screwed in base.

527. Confederate 6.4-inch shell.

Flanged, brass base ring. Five flanges on base ring, lead fuze plug in point.

528. Confederate 6.4-inch shell.

Flanged, lead base ring. Five flanges on base ring, lead fuze plug closed by copper screw plug in point of shell. It appears to have a percussion cap plunger in it.

529. Confederate 6.4-inch wrought-iron shot.

Copper ratchet sabot, held by central bolt screwed into base.

530. Confederate 7-inch shot.

Copper ring around base.

531. Unknown 2-inch fired shot.

Brass sabot, twelve bands and twelve grooves shown by marks on band.

532. Confederate 6.4-inch shot.

Copper ratchet sabot at base.

533. Confederate 8-inch shell.

Fired, copper cup ring around lower part of shell, marked "M. A. W. P." on ring; tapered hole in point of shell for wooden fuze plug, a long tapered lug on base of shell, and body of shell tapered from base to point.

534. Confederate 7-inch shell.

Copper ring at base. Tapered hole for wooden fuze plug in point of shell.

535. Confederate 7-inch shell.

Copper ring round base; ring loose (started). This is a short shell with an ogival head about one half the length of the shell,

536. Confederate 6.4-inch shell.

Weight 58 lbs., copper plate missing; two bands cast on body, one at base of ogival head and one on base of shell which are turned to the proper dimensions so as to save labor by not turning the whole body.

537. Confederate 6.4-inch shell.

Weight 64 lbs., captured in Fort Harrison. A condemned wrought-iron cup replaced by a copper plate and brass ring, to secure fuze plug. Captured in the magazine of Fort Harrison, north of James River, and was designed for an old 32-pdr. sea-coast gun, banded and rifled. Wrought-iron cup on base, condemned, and a copper plate with three dowels and central bolt added. Base of shell partly cut away to show wrought-iron cup.

538. Confederate 6.4-inch shell.

Weight 76 lbs., copper plate, tarred rope lashing. There was originally tarred rope lashing between copper plate and base of shell. There are three lugs cast on base of shell which fit into holes in plate, and plate is fastened by a central bolt screwed into base of shell.

539. Confederate 6.4-inch shell.

Weight 60 lbs., captured from Fort Harrison. A condemned copper ring removed, and replaced by a copper plate, a tarred rope lashing, not shown, was between the plate and shell; brass ring to receive fuze plug. Captured in the magazine of Fort Harrison, north of James River, and was designed for an old 32-pdr. sea-coast gun, banded and rifled (Abbott, page 101). Copper plate has three dowels and is held by a central bolt. Fifteen second fuze in point, paper fuze in brass case.

540. Confederate 6.4-inch shell.

Weight 58 lbs., tarred rope lashing between copper plate and shell. Copper screw plug or fuze in point of shell. There is some rope between shell and plate.

541. U. S. Parrott 6.4-inch shot.

Weight 92 lbs., brass ring. Part of ring cut away to show construction.

542. U. S. Parrott 6.4-inch shell.

Weight 81 lbs., brass ring. Part of ring cut away to show construction.

543. U. S. Parrott 6.4-inch chilled head shot.

Brass ring on base. Marked "Patented 1861," on band.

544. Schenkl 5.82-inch shell.

Papier-maché sabot. Fuze marked "J. P. Schenkl. Pat. Oct. 16, 1861," in point of shell.

545. Confederate 6.4-inch wrought-iron shot.

Weight 95 lbs. Groove in base of shell which makes an expanding lip.

546. Confederate 6.4-inch shell.

Weight 60 lbs. Captured in Fort Harrison, lead sabot, copper ring to receive fuze plug. One half of sabot cut away to show construction. Fuze in point of shell.

547. Confederate 6.4-inch shot.

Weight 67 lbs., from Naval Laboratory; square iron projection and iron screw, copper cup. Square projection cast on base of shot fits in sabot, and sabot is held by an iron bolt screwed into this lug. Base of shot is tapered for the sabot to expand on. Head of shot is the tapered reamer pattern with six diagonal cutting edges. Body of shot is less in diameter than head or base. Wrought-iron shot.

548. Confederate 6.4-inch shot.

Weight 90 lbs., from Naval Laboratory; square iron projection and iron screw, copper cup. Square iron projection cast in base of shot, fits in square hole in sabot, and sabot is held by an iron bolt screwed into the lug. Base of shot is tapered for the sabot to expand on. Head of shot is the tapered reamer pattern, with eight diagonal cutting edges. Body of shot is less in diameter than head or base. Wrought-iron shot.

549. Confederate 6.4-inch shell.

Weight 56 lbs., lead ring; greased cotton cord around top; rotating device missing; copper ring in point of shell to receive fuze plug.

550. Confederate 6.4-inch wrought-iron shot.

Weight 75 lbs., made at Tredegar Works, Richmond, Virginia. Groove turned in base of shot to form an expanding lip.

551. Confederate 6.4-inch shell.

Copper cup ring cast in at base. Two raised rings cast on body of shell are 6.6-inches in diameter. This may be a 6.4-inch shell unfinished, the rings not having been turned down. Tapered hole in point of shell to receive wooden fuze plug.

552. Confederate 6.4-inch shot.

Copper disk at base; fired; copper plate cast into base of shot (same system as 570). Marks from rifling on plate. This is evidently an improvement on the three dowels and central bolt plate, and is intended to prevent the plate from detaching itself in flight.

553. Confederate 4.5-inch shell.

Flanged; lead base ring; three flanges on ring; lead fuze plug closed by a brass screw plug in point of shell, had a percussion cap plunger in it.

554. Confederate 4.62-inch shell.

Weight 28 lbs., copper plate at base; copper plate has three holes in it to fit over three lugs or pins on base of shell, and is held by a central bolt; copper fuze plug in point of shell.

555. Confederate 5.82-inch shell.

Copper ring round base; tapered hole in point of shell.

556. Confederate 6.4-inch shell.

Weight 58 lbs., captured at Fort Harrison; lead sabot; soaped rope yarn at junction; copper ring to receive fuze plug; sabot and plug missing. Wooden plug in point of shell; four flanges on body of shell.

557. Confederate 6.4-inch shot.

Weight 61.5 lbs., from Naval Laboratory; copper cup sabot missing, iron washer with nut and dowels. Bolt and three dowels on base of shot which fit into holes in sabot; sabot is held by a nut screwed on bolt. Base of shot is tapered for sabot to expand on. Head of shot is tapered reamer pattern with five diagonal cutting edges. Body of shot is less in diameter than head or base. (See Abbott, page 103.) The point made of wrought-iron.

558. U. S. Sawyer 5.82-inch shell.
Weight 41 lbs., flanged and lead coated; part of lead coating cut away to show construction. Tapered hole for fuze plug in point of shell.

559. Confederate 5.82-inch shell.
Weight 57.5 lbs., copper plate secured by screw and held firm by three dowels on base of shell seated in three holes in copper plate and central bolt screwed into base of shell.

560. U. S. Schenkl 4.5-inch shell.
Weight 26 lbs., papier-maché, sabot missing. Fuze with leather washer in point of shell, marked "P. S. Schenkl, Pat. Oct. 16, 1861."

561. Confederate 4.62-inch shell.
Weight 29 lbs., copper cup at base. Copper cup cast into base. Part of base of shell cut away to show construction. Screw thread in hole in point of shell to receive fuze plug.

562. U. S. Sawyer 3.67-inch shell.
Weight 13.2 lbs., lead coated, base of shell tapered for lead to expand on. Part of lead coating cut away to show construction.

563. U. S. Dyer 4.5-inch shell.
Weight 23 lbs., lead sabot missing; threaded fuze hole in point.

564. U. S. Dyer 4.5-inch shot.
Weight 31 lbs., lead sabot. Part of lead sabot cut away to show construction.

565. U. S. Absterdam 4.5-inch shell.
Weight 32.5 lbs., lead sabot and bands, two lead body bands and lead sabot partly cut away to show construction. Threaded fuze hole in point of shell.

566. U. S. Parrott 4.2-inch shell.
Weight 25 lbs., brass ring on base. Lead fuze plug has a percussion cap plunger in it and is closed by a lead screw plug in point of shell. Part of ring cut away to show construction.

567. Confederate 4.62-inch shell.
Copper ring round base, tapered hole in point of shell for wooden fuze plug.

568. Confederate 5.2-inch shell.

Weight 24 lbs., base piece and lead band missing. The three longitudinal grooves which are generally on body of Hotchkiss shells to allow flame to pass over and ignite time fuze, are not on this shell.

569. Confederate 4.62-inch shell.

Weight 21.5 lbs., copper plate secured by screw and held firm by three dowels seated in holes in base of shell, and it is held by a central bolt secured into base. Tapered hole in point of shell. There are three notches on base rim of shell and three notches in circumference of plate evidently to allow flame to ignite fuze.

570. Confederate 4.62-inch shot.

Copper disk at base. Copper plate cast into base of shot. This is evidently an improvement on the three dowels and central bolt to prevent the plate detaching itself in flight.

571. U. S. Parrott 2.9-inch shell.

Weight 9.2 lbs., brass ring at base, lead fuze plug in point of shell. Part of brass ring cut away to show construction.

572. U. S. Parrott 3.67-inch shell.

Weight 16.5 lbs., brass ring at base; lead fuze plug in point of shell. Part of ring cut away to show construction.

573. U. S. Schenkl 4.2-inch shell.

Weight 24 lbs., papier-maché sabot missing. Fuze marked "J. P. Schenkl Pat. Oct. 16, 1861," with leather washer in point of shell.

574. U. S. Schenkl 3.67-inch shell.

Weight 19 lbs., papier-maché sabot missing. Fuze marked "J. P. Schenkl Pat. Oct. 16, 1861," with leather washer in point of shell.

575. Sawyer shell.

Lead and brass covering.

576. U. S. Schenkl 3-inch shell.

Weight 7.8 lbs., papier-maché sabot missing. Threaded fuze hole in point.

577. U. S. Hotchkiss 3-inch shell.

Weight 9 lbs., compressed lead band, fired. Threaded fuze hole in point, three longitudinal grooves on body to allow flame to ignite fuze.

578. Brooke Confederate 7-inch shell.

Fired from Confederate Fleet at the U. S. Gunboat, Keystone State, Commander LeRoy, and by which shell, vessel and forty of her crew were disabled January 31, 1863, during the attack upon the Blockading Fleet off Charleston, S. C., by the Iron Clad Rams of the Confederate Navy.

579. 20-inch Rodman Gun shell.

Weight 850 lbs. At Ordnance Laboratory.

580. Confederate 10-inch flat head shot.

Copper ring on base. At Ordnance Laboratory.

581. Confederate 10-inch shell.

Copper band on base. At Ordnance Laboratory.

582. Booth Arrow Canister, diameter 4.75-inch.

This is a tin case with a loose cover, filled with long cartridges or slugs 6 inches long, with lead bullets about 3 inches long. These bullets are held firm in the brass cartridge case by the lead from the bullets entering eight holes bored into the cartridge case. Evidently the heads from the cartridges have been removed and the powder extracted and wooden plugs inserted. There are now twenty-three cartridges and an iron piece in it.

583. Booth Arrow Canister, 12-pdr.

584. Chain shot.

With cavity for chain in center.

585. Chain shot.

In four parts, held by a ring in front.

586. Chain shot.

With two shot attached to chain.

587. Chain shot.

With two shot attached to chain.

588. Chain shot.

And case.

589. McIntyre's repeating rifle fired shell.

590. McIntyre's repeating shell.

591. McIntyre's repeating shell.

592. McIntyre's repeating shell.

593. Puffer's incendiary shell.

594. Flemming's incendiary shell.

595. Model of shot.

Invented and patented June 11, 1872, by Sergeant John Rigney, of the U. S. Military Academy Ordnance Detachment, West Point, New York. Object of patent, to lock sabot firmly on projectile and to lubricate bore of gun.

596. McIntyre's spherical case shot.

Cut.

597. 32-pdr. shot.

Fired at West Point, N. Y., lead cup at base.

598. 32-pdr. shot.

Fired at West Point, N. Y., brass cup at base.

599. Confederate rifle shot.

Lead band at base.

600. Experimental shell.

Brought to West Point to be fired; brass cup at base.

601. 15-inch shell.

For Rodman gun, weight 316 lbs. At Ordnance Laboratory.

602. Emory shell.

For rifled gun; brass band at base.

603. Cochran diagonal flanged shot.

Two lead bands round base, base cupped.

604. Abbott shell.

Elongated projectile for smooth-bore cannon.

605. Abbott shot.

Elongated projectile for smooth-bore cannon.

606. Abbott shot.

Elongated projectile for smooth-bore cannon.

607. Old pattern carcass 8-inch.

608. 12-pdr. quilted grape shot.

609. Bag of cut iron links.

Captured from the Confederate Army, at Hilton Head, S. C., it was to be used as grape shot. Bag made of canvas.

610. 10-inch mortar shell.

Dug out on the plain at West Point in 1851.

611. Unknown 12-inch rifle projectile.

Lead band on base; two raised rings on body.

At Ordnance Laboratory.

612. Allen shot.

613. 30-pdr. Parrott shot.

Fired.

614. War Rocket.

615. 10-inch light ball.

Fire or Light Balls are projectiles of oval shape formed of sacks of canvas, filled with combustible composition. They were used to light up the enemy's works and are loaded with shells to prevent them from being approached.

616. Confederate percussion encased shell.

617. 30-pdr. Butler shot.

618. Wheats' shell.

Copper flanged.

619. Whitworth blind shell.

Flanged system, for firing against armor plates made of tempered steel, each end closed with a screw plug.

620. Experimental diagonal flanged shot.

Brought to West Point to be fired, iron and wood sabot.

621. Confederate 10-inch wrought-iron projectile.

For smooth bore guns, weight 211 lbs. At Ordnance Laboratory.

622. Confederate 8-inch Maury chilled iron projectile.

Weight 100 lbs. Air passage through center.

623. Confederate 10-inch Maury chilled iron projectile.

Weight 200 lbs. Air passage through center.

At Ordnance Laboratory.

This invention was brought from England by a man named U. F. Maurey (not formerly of the U. S. Navy), and proposed to the rebel Ordnance department, in March, 1864. Its peculiarity consisted in the central and axial aperature by which the alignment while it was describing its trajectory was to be maintained. The annular cup shown in the base, was for the purpose of bringing the centre of gravity more nearly into coincidence with the centre of figure, thereby facilitating the maintenance of alignment. The Chief of Ordnance was impressed by it, and some of them were ordered to be cast for the purposes of experiment, which was subsequently performed at Drury's Bluff.

Eighteen shots were fired in all, fifteen at long range, and three at a short range of about 300 yards, into a perpendicular bank, with results which from the minutes, made at the time, may be summed up as follows. In all the shots at long range the absence of any other drift or erratic deflection from line of fire than would have been experienced under like circumstances with spherical shot, showed that a true alignment had been attained. The shots fired at short range cut circular holes in the bank every time, which showed that the axis of the shot was tangent to the trajectory. The gun used was an 8-inch Columbiad of the ordinary model. The shot had a windage of only about two-hundredths of an inch, the centre aperture having a cross section of three-fourths of a square inch, and the weight of the shot was 96 pounds. Ten pounds of powder was the charge used. A singular fact was observed in connection with shots fired at same elevation, which was, that their ranges were about the same as would have been given by round shot a third lighter with the same charge and elevation. The recoil of the piece was quite violent, and the experiment was terminated by its being thus dismounted from its carriage.

Encouraged by these results, more shots were prepared and a subsequent experiment made at Chaffin's Bluff which led to identical conclusions. When preparing for the second experiment it was proposed to the Inspector of Ordnance in the Richmond Arsenal, under whose orders the shots were prepared, that the central opening should be omitted in casting, or plugged, as a means of ascertaining its precise effect. Whether the suggestion was acted on is not known. During the latter portion of the same year a large number of the projectiles were manufactured for use in the service, but whether any of them were ever actually employed in action is not known.

They were cast in chills for the double purpose of hardening and dispensing with the necessity of turning to gauge, which would have been required in sand moulds.

624. Confederate 8-inch Maury chilled iron projectile.
For smooth-bore guns, weight 102 lbs. Air passage through center. Towards the last they were modified somewhat from the original form by omitting the annular recess on the side.

625. Confederate 5.5-inch cast-iron shot.
For smooth-bore guns, weight 25 lbs.

626. Confederate winged shot.
From battle field in Tennessee.

627. Experimental shot.
Diagonal flanged.

628. Smith's flanged shot.
Fired at West Point.

629. Smith's flanged shot.
Fired at West Point.

630. Whitworth long shell.
Flanged system, formed so as to fit the cross section of the bore of the Whitworth gun, hexagonal, with corners slightly rounded.

631. Whitworth long shell.

632. Huginin shell.
Fired at West Point, wood sabot.

633. Turbine shot.
Fired at West Point; air passage through center.

634. Unknown shell.
Lead base covered with canvas.

635. Experimental diagonal flanged shot.
Fired at West Point; wood; lead and iron sabot.

636. Confederate shot.
Wire through center.

637. Stand of grape shot, 12-pdr.

638. Whitworth long shell.

639. Stand of grape shot, 6.8-inches.

640. Canister, model unknown, 6-pdr. (cal. 3.″67).
This is a cast-iron case with a cup base having a hole in center. It has a wooden top or cover. It is filled with balls 7-inches diameter.

641. Blakely shell, for 900-pdr. gun.
Copper flanged and ring copper. At Ordnance Laboratory.

642. Armstrong shell.
Brass studs.

643. Canister, 42-pdr.

644. Spherical case shot and sabot, 6-pdr.

645. Spherical case shot and sabot, 12-pdr.

646. Spherical case shot and sabot, 24-pdr.

647. Spherical case shot and sabot, 24-pdr.

648. Gun shell and sabot, 12-pdr.

649. Gun shell and sabot, 18-pdr.

650. Spherical case shot and sabot, 8-inch, English.

651. English boxer and sabot, 6-pdr.

652. Gun shell and sabot, 24-pdr.

653. Gun shell and sabot, 32-pdr.

654. Gun shell and sabot, 42-pdr.

655. Gun shell and sabot, 8-inch.

656. Gun shell and sabot, 10-inch.

657. 24-pdr. Carcass.

Carcass is a hollow cast-iron projectile filled with burning composition, the flame of which issues through four fuze holes, to set fire to combustible objects.

658. 10-inch Carcass.

659. 24-pdr. Mortar shell.

660. 8-inch Mortar shell.

661. 10-inch Mortar shell.

662. 13-inch Mortar shell.

At Ordnance Laboratory.

663. Confederate shell.

Brass band on base, flanged.

664. Confederate shell.

Lead band on base, flanged.

665. Confederate shell.

Lead band on base, flanged.

666. Laidley shell.

Invented by Colonel Laidley, U. S. Ordnance Department.

667. Henry shot.

Copper band.

668. Henry shell.

Copper band on middle of shell, eight recesses in base portion of shell at base of rotating band for the gas pressure to expand band; band is flush with body of shell.

669. Armstrong shrapnel.
Brass studs.

670. Laidley shot.
Lead band.

671. Allen shot.
Iron band ✠ shaped base.

672. Allen shot.
Copper band.

673. Allen shot.
Brass band.

674. 12-inch Dyer shot.
Flat head. At Ordnance Laboratory.

675. Reed shell.
Iron band.

676. Reed shot.
Iron band.

677. Reed shot.
Iron band.

678. Reed shell.
Iron band and fuze or plug.

679. Reed shot.
Iron band.

680. 12-inch Dyer shell.
At Ordnance Laboratory.

681. Dimick shell.
Fired, rope wound on lead body.

682. Dimick shell.
Fired, lead band on body.

683. Dimick shell.
Separate lead base or band with seven seats for corresponding lugs on body of shell.

684. Dimick shell.
Lead band.

685. Dimick shell.
Lead band.

686. Dimick shot.
Lead band.

687. Confederate Armstrong blind shell, 8-inch.
Weight 145 lbs., copper studs, bursting charge contained in woolen bag. Captured at Fort Fisher, North Carolina.

688. 15-inch steel shot.
Fired against wrought-iron target at Sandy Hook, from 15-inch gun. At Ordnance Laboratory.

689. Hotchkiss shot.
Consists of a body and base of cast-iron, connected by a jacket of lead. Upon firing the powder gas forces the base upon the body expanding the lead into the grooves.

690. Gorgas shot.
Lead body band, steel or iron base band, base screwed on.

691. Lawson shot.
Lead body band with 6 lugs on top and 6 lugs on bottom of band set in shot.

692. James shot.
Hollow conical base, with several radial openings to the surface for powder-gas to expand an envelope composed of paper, canvas and lead into grooves of the bore.

693. James canister.

694. Dyer shell.
Body of cast iron with soft metal expanding cup attached to base. The base is tinned and cup cast upon it. Invented by General A. B. Dyer, late Chief of Ordnance, U. S. A.

695. Dyer shot.
Fired, soft metal base band, with lugs let into body of shot.

696. Dyer shrapnel.

697. Confederate shell.

698. Dyer canister.

699. 12-inch Blakely shell.

Copper flanged. At Ordnance Laboratory.

700. 12-inch Blakely shot.

Brass flanged. At Ordnance Laboratory.

701. Hotchkiss shot fired.

702. Hotchkiss shrapnel.

Lead jacket, has three grooves to allow flame from powder charge to light time fuze in front.

703. Hotchkiss canister.

704. Hotchkiss shot.

705. Absterdam shell.

Lead sabot, dovetailed in place, and two lead body bands.

706. 4-pdr. Blakely shot.

Lead sabot band.

707. 4-pdr. Blakely shot.

Lead sabot band.

708. Parrott shell.

Iron cup on base.

709. Parrott shell.

Iron cup, fired.

710. Parrott 3.67-inch shell.

Brass ring at base, weight 16.5 lbs.

711. Parrott shell.

Brass band; band cast upon projectile leaving a circular channel between it and the base. The gas pressure acting in channel forces band into the grooves.

712. Confederate 8-inch shell.
Weight 114 lbs., iron flanged, from Fort Fisher, North Carolina.

713. Hotchkiss shell.
Brass cup in four sections, and wax lubricant between the shell and cup. Patented at close of war.

714. Hotchkiss shot.
Brass cup in three sections, and wax lubricant between shot and cup.

715. Schenkl shell.
Papier maché sabot.

716. Confederate shell.
Iron cup, fired.

717. Reed shot.
Fired from 8-inch Columbiad rifle at West Point, N. Y.

718. Confederate shell.
Copper band.

719. Confederate wrought-iron 6.4-inch shot.
Groove in base forming an expanding lip.

720. Confederate shot.
Copper disk.

721. Confederate 8-inch shell.
Copper band.

722. Confederate 3-inch shot.
Copper cup.

723. Confederate 6.4-inch shot.
Copper base plate dowelled and bolted on, supposed to have rope lashing between plate and shot.

724. Confederate 6.4-inch shell.
Copper base plate dowelled and bolted on.

725. Confederate 6.4-inch shot.
Fired; copper base plate dowelled.

726. Confederate 3.5-inch shell.
Copper base plate dowelled.

727. Confederate 3.5-inch shot.
Copper and wood base dowelled, rope lashing between base plate and shot.

728. Confederate 3-inch shell.
Brass and wood base dowelled.

729. Fragment of shot.
Fired June 25, 1862, from a Confederate Battery near Mechanicsville, Va. Presented by General T. Seymour, U. S. Volunteers, to the U. S. Military Academy.

730. Confederate 3-inch shell.
Copper and wood base dowelled, base plate has three notches.

731. Absterdam 3-inch case shot.
Brass rotating band.

732. Confederate 3-inch shot.
Corrugated brass band at base.

733. Confederate 3.75-inch fired shot.
Corrugated brass band at base, and lug on point of shot.

734. Confederate 6-inch shell.
Corrugated brass band at base.

735. Confederate 3.75-inch shot.
Brass disk at base; brass disk has six radial cuts.

736. Confederate 2.25-inch shell.
Fired; copper cup ring at base, body of shell from near middle to base is ratchet shaped.

737. Confederate 3.65-inch shot.
Copper disk at base.

738. Confederate 3.65-inch B. L. shell.
Two copper bands round body of shell.

739. Emory 3.65-inch shell.
Brass band, filled with lead.

740. Confederate 3.5-inch shell.
Two lead bands round body of shell.

741. Confederate 5.75-inch shell.
Two lead bands round body of shell, base of shell missing.

742. Confederate 6.75-inch shell.
Copper cup with long wood sabot at base.

743. Confederate shell.
Lead sabot on base; lead sabot cut in half, filled with black sand and permanently closed by copper plug; weight 11.5 lbs., four longitudinal ribs on body.

744. Confederate 3-inch shot.
Fired, lead sabot on base.

745. Confederate 2.4-inch shot.
Fired, lead sabot on base.

746. Confederate 3-inch shell.
Lead band extending about half way up body, percussion cap plunger in front of shell, closed by a brass cap; what appears to be powder still in shell.

747. Confederate 3.65-inch shot.
Lead band, wood base.

748. Abbott 3-inch blind shell.
Iron and lead disk on base.

749. Experimental 3.6-inch shot.
Fired at West Point, N. Y.

750. Confederate 3-inch shot.
Lead band and wood sabot.

751. War rocket.
2.25-inch.

752. Confederate 3-inch shell.
Wrought-iron disk on base. Disk has eight notches and is held by three rivets, and central dowel in shell passing through hole in disk.

753. The first shot fired from Fort Sumter, April 13, 1861.
Found in the quarters of General Beauregard. 42-pdr. U. S. spherical solid shot.

754. The first shot fired at Fort Sumter, April 13, 1861.
Confederate Blakely 24-pdr. shot, lead sabot.

755. Three small cannon balls.
Cast-iron, taken from the Parapets of Fort Montgomery, N. Y., in 1871. Revolutionary.

756. Nine small cannon balls.
Found at Fort Montgomery, N. Y., and Battery Knox, West Point, N. Y. Supposed to be Revolutionary.

757. Craig blind 4-inch shell.
Lead base; body of shell at base is conical and fluted for lead sabot to grip upon; body of shell has six circumferential grooves, two of them near base, four near ogival head.

758. Archer 3.9-inch shot.
Copper base on sabot coated with lead; base of shot has cuts and cross cuts at right angles for sabot to grip upon, body of shot has two cuts in it.

759. Confederate 3-inch shell.
Wood sabot covered with zinc, lower half of shell is conical and has seven ribs on it. Over these the sabot fits and is held in place by a pin passing through a lug on base of shell. The sabot has a hole to allow lug of shell to pass through it. Zinc on sabot is cut, turned over and nailed to wooden sabot. This shell has paper time fuze and fuze plug with leather washer in it.

760. Confederate 3.75-inch shell.
Composition band round body of shell, six pin wheel grooves in base which extends under composition band. Band is 3.3″ wide and 0.4″ thick. Percussion cap plunger in point of shell which is closed by a brass screw-cap.

761. Dyer 3.65-inch shell.

Lead case, one section.

762. Confederate 3.4-inch shot.

Wood, lead and copper bands on base. Shot made of wood, lead band covered with sheet copper at base, ¾-inch hole in base of shot about 2 inches deep.

763. Butler 3-inch shell.

764. Butler 4.5-inch shrapnel.

Cut, showing construction; brass head fastened by screws to cylindrical iron body, has wood filling from which an iron pipe covered with wood leads to bursting charge contained in tin or zinc bursting charge chamber situated in base of projectile and separated from the filling of balls by an iron disk. Brass rotating ring at base, fuze plug to be screwed in head.

765. Butler 8-inch cored shot.

One section cut away showing construction. Brass rotating ring shows how band took rifling.

766. Butler 8-inch cored shot.

767. Arrick 8-inch cored shot.

Brass cup held by screw-bolt in centre of base; base of shell on which sabot bears is tapered, smaller end to the rear. Upon firing, the sides of the cup are forced forward and expanded into the grooves.

768. Dana 8-inch cored shot.

Rotating ring missing.

769. 15-inch hollow shot.

Fired by the U. S. Fleet of Iron Clads at Fort Sumter, April 7, 1863. Presented to the Citadel Academy of Charleston, S. C., by General Beauregard, April 27, 1863. Taken at Columbia, S. C., February 17, 1865, by the troops of the U. S. under General Sherman. Presented to the U. S. Military Academy by Major General W. B. Hazen, April 1, 1865.

770. 20-inch Rodman shell.

At Ordnance Laboratory.

771. 8-inch carcass.

Spherical, hollow with four exterior openings. The object of the carcass is to set fire to wooden structures by the flame of the burning composition which issues from holes.

772. 8-inch steel armor piercing shot.

773. 8-inch cast-iron shot.

774. 8-inch cast-iron shell.

Charge gunpowder.

775. 8-inch cast-iron shell.

Charge guncotton.

776. 8-inch cast-iron shell.

Charge emmensite.

777. 8-inch Eureka cast-iron shell.

Charge gunpowder.

778. 8-inch Butler chilled iron shot.

779. 5-inch siege shell.

Charge gunpowder.

780. 3.2-inch field canister.

781. 3.2-inch field shell.

Charge gunpowder.

782. 3.2-inch shrapnel.

Point charge.

783. 3.2-inch shrapnel.

Base charge.

784. Model solid shot for Krupp's 150-ton gun.

Weight 3300 lbs., 17.25-inch.

785. Model 12-inch mortar shell, for deck piercing.

Weight 1000 lbs.

786. Model 12-inch solid shot, for B. L. rifle.

Weight 1000 lbs.

787. Model 10-inch solid shot, for B. L. rifle.
Weight 575 lbs.

788. Model 8-inch solid shot, for B. L. rifle.
Weight 300 lbs.

789. Model 7-inch shell, for siege mortar.
Weight 125 lbs.

790. Model 7-inch shell, for siege howitzer.
Weight 105.9 lbs.

791. Model 5-inch shell, for siege B. L. rifle.
Weight 45.20 lbs.

792. Model 3.6-inch shell, for B. L. rifled mortar.
Weight 20 lbs.

793. Model 3.2-inch shrapnel, for B. L. field rifle.
Weight 13.5 lbs.

794. Model 3.2-inch shell, for B. L. field rifle.
Weight 13.5 lbs.

795. Parachute rocket.

796. War rocket.

797. Board containing rapid fire ammunition.

798. Frame containing samples of ammunition from the Union Metallic Cartridge Company.

799. 20-inch stone ball.

At Trophy Point.

QUARTERMASTER GENERAL'S OFFICE.

SIR: WASHINGTON CITY, June 21, 1856.

There is at the Navy Yard, Brooklyn, N. Y., a large stone ball procured at Smyrna by Major Delafield, and brought to the United States by the store-ship Supply, which is proposed to be sent to the Superintendent of the Military Academy, at West Point, N. Y., "to serve as an illustration in the Department of Ar-

tillery." The Secretary of War having approved the measure, you are requested to forward the ball to West Point by an early opportunity. Enclosed is a note from Major Delafield to the Commandant of the Navy Yard, to deliver it to your order.

Very respectfully, your obt. servt.,

(Sgd.) THOS. S. JESSUP,
Q. Mr. General.

Brig. Gen. HENRY STANTON,
Asst. Q. Mr. Genl., New York.

Stone projectiles were used before the invention of gunpowder, and very generally after it, until the year 1400, when the French made them of cast-iron. Until comparatively recently, bronze guns, throwing stone balls of enormous caliber, were used by the Turks in defending the passage of the Dardanelles. When the English fleet forced the passage of these straits a stone ball weighing 800 lbs., struck and nearly destroyed one of the ships.

SUB-SECTION.

Primers, Fuzes and Torpedoes.

This sub-section contains models of the U. S. service primers and fuzes, some Confederate primers and fuzes, and several interesting Confederate torpedoes.

800. Board containing Frankford Arsenal combination fuze 15 seconds, model 1894.

This board shows the various parts constituting the fuze; the fuze assembled with quarter section cut away and the complete fuze. This fuze is used for field and siege shrapnel. A combination fuze is one which, besides the time fuze to explode the shrapnel or shell within a certain time, has a concussion or percussion device which will explode the projectile on impact if the time fuze fails or the projectile strikes before the time fuze is burned through.

801. Board containing Frankford Arsenal friction cannon primer.

This board shows the parts in the various stages of manufacture, and the complete primer. This primer is used for field and siege cannon.

802. Board containing Frankford Arsenal electric cannon primer.

This board shows the parts composing the primer in the various stages of manufacture and the assembled primer. This primer is used for sea-coast cannon.

803. Board containing Frankford Arsenal obturating friction primer.

This board shows the parts composing the primer in the various stages of manufacture, the assembled primer with quarter section cut away, and the complete primer. This primer is used for sea-coast cannon. The obturating primer, used in sea-coast rifles, screws into the vent and prevents the escape of gas upon firing.

804. Board containing Frankford Arsenal obturating electric primer.

This board shows the various parts in the different stages of manufacture and assembling, the assembled primer with quarter section cut away to show the interior, and the complete primer. This primer is used for sea-coast cannon.

805. Board containing Frankford Arsenal "N" fuze, model 1894.

This board shows the various parts, the different stages of assembling, the assembled fuze with quarter section cut away to show interior, and the complete fuze.

This is a point percussion fuze.

806. Board containing Frankford Arsenal "A" fuze, model 1894.

This board shows the various parts, the different stages of assembling, the assembled fuze with quarter section cut away to show interior, and the complete fuze.

This is a base percussion fuze.

807. Board containing Frankford Arsenal "C" fuze, model 1894.

This board shows the various parts, the different stages of assembling, the assembled fuze with quarter section cut away to show interior, and the complete fuze.

This is a base percussion fuze for field and siege shells.

808. Board containing Frankford Arsenal 1.65 fuze, model 1894.

This board shows the various parts, the different stages of assembling, the assembled fuze with quarter section cut away to show interior, and the complete fuze.

This is a point percussion fuze for Hotchkiss mountain gun shell.

809. Two boxes containing Confederate friction primers.

Note packing and what has been used as a tape; the poorest quality of cotton (muslin).

Presented to the U. S. Military Academy by Captain Orin B. Mitcham, Ord. Dept., U. S. A.

810. Three boxes containing Confederate friction primers.

These boxes of cannon primers were found among Confederate stores. Note that they are not marked at all, but examination shows wood to be English deal, or Norway pine. Evidently brought into the South by blockade runners.

Presented to the U. S. Military Academy by Captain Orin B. Mitcham, Ord. Dept., U. S. A.

811. Four packages containing Confederate time fuzes.

(Paper). These are in the original wrappers.

Presented to the U. S. Military Academy by Captain Orin B. Mitcham, Ord. Dept., U. S. A.

812. Three tin boxes containing Confederate friction primers.

Supplied from England to the Confederacy. These boxes have the original labels from English firms on them.

Presented to the U. S. Military Academy by Captain Orin B. Mitcham, Ord. Dept., U. S. A.

813. Four packages containing Confederate friction primers.

These packages are wrapped in leaves of the Holy Bible. Towards the end of the war, paper was scarce throughout the South and everything was utilized.

Presented to the U. S. Military Academy by Captain Orin B. Mitcham, Ord. Dept. U. S. A.

814. Spur priming tubes or primers, Confederate.

There are ten separate primers and two original packages. These were found in stores from the Confederate Armies of the South and West; they are made of paper; copper evidently having become scarce.

Presented to the U. S. Military Academy by Captain Orin B. Mitcham, Ord. Dept., U. S. A.

815. Confederate time fuze; also percussion time fuze.

Name unknown.

Presented to the U. S. Military Academy by Captain Orin B. Mitcham, Ord. Dept., U. S. A.

816. Confederate torpedo.

Intended to sink the U. S. Gunboats on the blockade at the mouth of St. John's River, Florida. Charge, 75 lbs. of powder. Horological torpedo. This, as its name implies, is an arrangement by which the explosion of the torpedo is effected after the lapse of a certain time, a point which is often necessary to attain in operations of this character. The exploding device consists simply of a train of clock work.

Presented to the U. S. Military Academy by Lieut. Col. W. Burns, Corps of Engineers, U. S. A.

817. Confederate torpedo.

From Light-House Inlet, Charleston, South Carolina.

Presented to the U. S. Military Academy by Lieut. Commander George Bacon, U. S. Navy.

818. Confederate torpedo.

Fretwell's percussion. Consists of a tin case filled with powder, except the air space at top for flotation. The explosion was effected by the ship striking a wire which draws the plug from hammer. This relieves the hammer which moves upward under action of spring and strikes its cap in bottom of torpedo. As far as ascertained, this torpedo did more execution than any other during the Civil War.

Presented to the U. S. Military Academy by 1st Lieut. G. V. Henry, 1st Artillery, Colonel 4th Massachusetts Volunteers. Commanding U. S. forces at West Point, Virginia.

819. Confederate torpedo.

A line of these torpedoes was stretched across the Louisville road, in front of the Confederate works at Savannah, Georgia.

Presented to the U. S. Military Academy by General A. Baird.

820. Confederate torpedo.

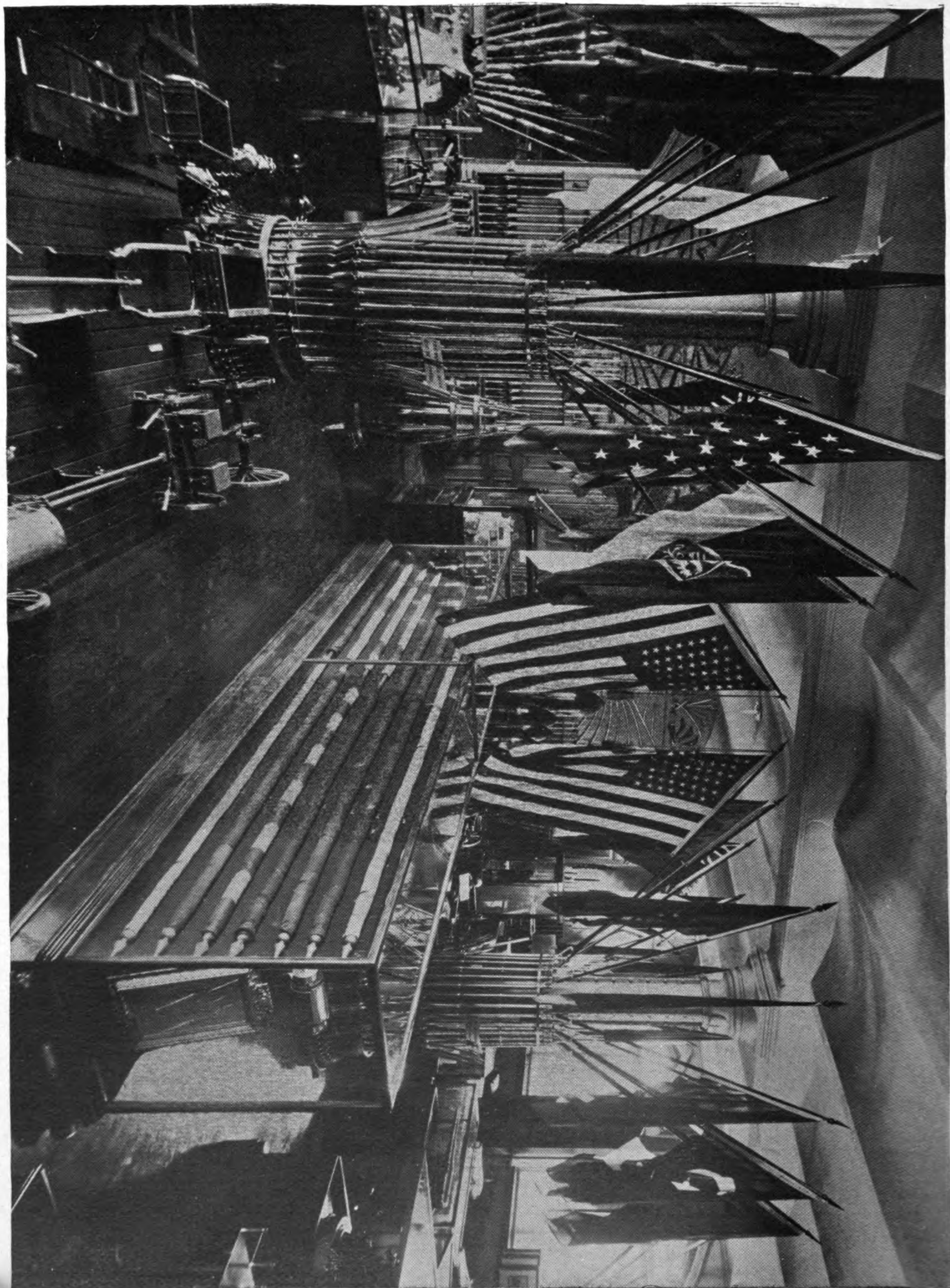
At Fort Clinton.

821. Confederate torpedo.

At Fort Clinton.

822. Confederate torpedo.

At Fort Clinton.



SECTION III.

This section contains the trophy flags of the Revolution, to be found in the Cadet Chapel, trophy flags and flag-staffs of the Mexican War, and many regimental and national colors carried by many organizations of the Army during the past hundred years; as for instance, the 4th U. S. Infantry regimental colors carried in 1794, and at battle of Tippecanoe in 1811; colors presented to the U. S. Corps of Cadets by the ladies of Boston; the first American flag hoisted at Vera Cruz, and at the Citadel of Mexico in the war 1846–7, on the capture of these cities by the U. S. Army, and the flags of various nations used as decorations.

FLAGS AND FLAG-STAFFS.

909. Panel, glass front, west side of Cadet Chapel, containing five flags captured by American Army in the Revolution.

The flag in centre and the one at each end were taken from the German mercenaries sent over by King George. They are all alike, the only difference being that two of them have the date 1775 on the obverse side, and the third, 1776. At least one of them was taken at Trenton, and the other two either there or at Yorktown. The inscriptions on both sides are worked out in colored silks and bullion. The obverse of the flag captured at Trenton bears a monogram (E. T. S. C. A.), surrounded by a wreath, surmounted by a crown, with 1775 at base of design. The reverse contains an eagle with olive branch in one talon and baton in the other, surmounted by an inscription on scroll. The other two in the case are British royal colors corresponding to the national colors carried by each of our regiments. They were captured at Yorktown. One of them was carried by a battalion of Light Infantry belonging to Cornwallis's forces, and this battalion was composed of the "light companies" of the 7th Regiment of the line, known as the Seventh Fusileers. The other English flag could not be identified with any particular regiment, owing to the fact that the insignia had been removed in some way. It was probably carried by the other battalion of Light Infantry that was with Cornwallis. Of these there were only two with him. All of these flags were originally the property of General Washington, by whom they were bequeathed to George Washington Parke Custis, the son of his adopted son, and grandson of Mrs. Washington. He bequeathed them to the War Department, which came into possession of them in 1858. The same year Secretary Floyd had them sent to West Point and presented to the Academy.

910. Panel, glass front, east side of Cadet Chapel, containing Mexican flags captured by the army in Mexico.

Presented to the Academy at the instance of General Scott.

911. Headquarter flag, Cavalry Reserve Brigade, 1st Division, Cavalry Corps, Army of the Potomac.

Carried through the War 1861-1865; 55 battles on record as follows: 1. Darbytown; 2. Smithfield; 3. Fisher's Hill; 4. Sailor's Creek; 5. Yellow Tavern; 6. Beaver Dam; 7. Meadow Bridge; 8. Maladequin Creek; 9. Tabernacle Church; 10. Liberty Mills; 11. North Anna; 12. South Anna; 13. Scott's Corners; 14. Mallory's Ford; 15. Tollgate; 16. Front Royal; 17. Cedarville; 18. Luray; 19. Brown's Gap; 20. Waynesboro; 21. Beverly Ford; 22. Kelly's Ford; 23. Todd's Tavern; 24. Spottsylvania Court House; 25. Cold Harbor; 26. Trevillian Station; 27. Wilderness; 28. Opequan, Dinwiddie Court House; 29. Sheridan's Raids; 30. Appomattox Station; 31. Appomattox Court House; 32. Culpepper; 33. Newtown; 34. Leetown; 35. Rappahannock Station; 36. Mount Crawford; 37. Manasses Plains; 38. Hanoverton; 39. Hawe's Shop; 40. Tunstall's Station; 41. Kearneysville; 42. Shepherdstown; 43. Cabletown; 44. Smithfield Crossing; 45. Milford; 46. Tom's Run; 47. Strasburg; 48. Middletown; 49. Newmarket; 50. Woodstock; 51. Winchester; 52. Cedar Creek; 53. Five Forks; 54. Richmond; 55. Lee's Surrender. This flag was presented to the Military Academy, West Point, N. Y., by Captain Alfred Gibbs, 3rd U. S. Cavalry, Brevet Major General, U. S. Army.

912. 6th U. S. Infantry National Colors.

Carried at Chancellorsville and Gettysburg.

913. Headquarters flag, 1st Cavalry Brigade, 3rd Division, Army of the Potomac.

Carried in the War 1861-1865. 1. Tom's Brook; 2. Shenandoah Valley; 3. Middletown; 4. Back Road; 5. Mount Jackson; 6. Sheridan's Raids; 7. Waynesboro; 8. Dinwiddie Court House; 9. Five Forks; 10. Deep Creek; 11. Sailor's Creek; 12. Appomattox Court House.

914. 5th U. S. Cavalry Regiment.

Colors carried through the War 1861-1865. 61 battles on record. (History.) This flag was presented to the Military Academy, West Point, N. Y., by the Officers of the Regiment, through Captain Wesley Owens, 5th U. S. Cavalry, October, 1865.

HEADQUARTERS 5TH U. S. CAVALRY,
CAMP EMORY, CUMBERLAND, MD., October 2nd, 1865.

Brig. General G. W. CULLUM,
Superintendent U. S. Military Academy,
West Point, N. Y.

GENERAL:

The standard which accompanies this letter is intended to represent the 5th U. S. Cavalry, among the Archives of the Academy, if you do us the kindness to accept it. It has been carried during the War by Sergeant, now Lieut. Henry Baker; Second Sergeant, afterward Lieut. John Stoddard; Third Sergeant, now Lieut. and Bvt. Captain James Hastings; and finally for two years and more by Sergeant John Schlottman of Company "E."

We respectfully ask a place for this old and worn out standard, feeling too much affection for it to trust its keeping to other hands than those of the custodians of the Archives of the Academy.

The following is a list of the engagements in which the regiment has participated; a great many more might be added, but the loss of the Regimental Records in the Shenandoah Valley in August, 1864, renders it impossible:

1. Fairfax Court House, June 17, 1861; Lieut. D. S. Gordon, 2d Cav., (serving with Regiment,) captured. 2. Falling Waters, July 2, 1861. 3. Blackburn's Ford, July 18, 1861. 4. Bull Run, July 21, 1861. 5. Drainsville, December 20, 1851. 6. Catlett's Station, March 12, 1862. 7. Siege of Yorktown, April 4 to May 4, 1862. 8. Williamsburg, May 5, 1862. 9. Hanover Court House, May 27, 1862. 10. Old Church, June 13, 1862; Capt. Royall and Lieut. McLean wounded. 11. Gaines' Mill, June 27, 1862; Lieut. Sweet killed; Capt. Whiting captured; Capt. Chambliss, Lieuts. Watkins and Arnold wounded. 12. Savage Station, June 28, 1862. 13. White Oak Swamp (1st), June 29, 1862. 14. Charles City Cross Roads, June 30, 1862. 15. Malvern Hill, July 1, 1862. 16. Sycamore Church, August 3, 1862. 17. White Oak Swamp (2d), August 7, 1862. 18. South Mountain, September 14, 1862. 19. Antietam, September 17, 1862. 20. Shepherdstown Ford, September 19, 1862. 21. Halltown, September 26 and 29, 1862. 22. Upperville, November 2, 1862. 23. Markham Station, November 9, 1862; Lieut. Hastings wounded. 24. Little Washington, November 10, 1862. 25. Amesville, November 11, 1862. 26. Fredericksburg, December 13, 1862. 27. Kelly's Ford, March 17, 1863. 28. Flemming's Cross Roads, May 4, 1863; Capt. Owens and Lieut. Buford captured. 29. Beverly Ford, June 9, 1863; Lieuts. Dickerson and Urban wounded. 30. Aldie, June 17, 1863. 31. Middleburg, June 18, 1863. 32. Upperville, June 21, 1863. 33. Gettysburg, July 3, 1863. 34. Williamsport, July 6, 1863. 35. Boonsboro', July 8 and 9, 1863. 36. Wapping Heights, July 22, 1863. 37. Brandy Station, August 1, 1863;

Lieut. Wilson wounded. 38. Brandy Station, August 4, 1863. 39. Bristow Station, October 14, 1863; Lieuts. Jones and Montgomery captured. 40. Morton's Ford, February 1, 1864. 41. Wilderness, May 5 and 11, 1864. 42. Todd's Tavern, May 7 and 8, 1864; Capt. Ash killed. 43. Beaver Dam, May 10, 1864; Lieuts. Sweatman and Wilson captured. 44. Yellow Tavern, May 11, 1864. 45. Mechanicsville, May 12, 1864. 46. Cold Harbor, June 1 and 12, 1864. 47. Trevillian Station, June 11 and 12, 1864; Lieut. Hamley killed. 48. Deep Bottom, July 28, 1864; Lieuts. Maley and Urban wounded. 49. Kearneysville, August 25, 1864. 50. Smithfield, August 29, 1864; Lieut. Dwyer captured. 51. Winchester, September 19, 1864; Lieuts. Fitzgerald and Trevor killed; Lieuts. Robbins and Murphy wounded. 52. Milford, September 22, 1864; Lieut. McIntosh (Brig. Gen'l of Vols.) wounded. 53. Front Royal, September 23, 1864. 54. Woodstock, October 9, 1864. 55. Cedar Creek, October 19, 1864. 56. Sheridan's James River Raid, February 1865. 57. South Anna Bridge, March 12, 1865. 58. Dinwiddie Court House, March 30, 1865; Capt. Lieb wounded and Lieut. Donnery captured. 59. Five Forks, April 1, 1865; Capt. Drummond killed. 60. Amelia Court House, April 2, 1865. 61. Surrender of Lee's Army, April 9, 1865.

We have the honor to be
Very respectfully, your obedient servants,

W. H. Emory,
Col. 5th U. S. Cavalry,
Bvt. Brig. Gen'l U. S. A., Major Gen'l of Vols.

W. Owens,
Capt. and Bvt. Lt. Col.

Jas. P. Ruggles,
2d Lieut. 5th U. S. Cavalry.

Jno. C. Dunnery,
1st Lieut. 5th U. S. Cavalry.

James Hastings,
Bvt. Capt. 5th U. S. Cavalry,
Adjutant.

J. W. Mason,
Capt. 5th U. S. Cavalry,
Bvt. Major U. S. A.

S. Walker,
Capt. 5th U. S. Cavalry.

Robert Sweatman,
1st Lieut. 5th U. S. Cavalry.

R. H. Montgomery,
1st Lieut. 5th U. S. Cavalry.

Philip Dwyer,
1st Lieut. 5th U. S. Cavalry,
R. C. S.

915. Cadet Colors.

Presented to the U. S. Corps of Cadets by the ladies of Boston.

916. Mexican flag.

Captured by the U. S. Army in Mexican War.

917. Flag of Battery "K," 1st U. S. Artillery.

Carried through the Mexican War, and the War 1861-1865. 1. Contreras, Mexico, August 19, 1847; 2. Chapultepec, Mexico, September 12, 1847; 3. Churubusco, Mexico, August 20, 1847; 4. Molino Del Rey, Mexico, September 8, 1847; 5. City of Mexico, September 12, 13 and 14, 1847; 6. Golding's Farm, June 28, 1862; 7. Malvern Hill, July 1, 1862; 8. Bull Run, August 30 and 31, 1862; 9. Chantilly, September 2, 1862; 10. Antietam, September 17, 1862; 11. Fredericksburg, December 13, 1862; 12. Chancellorsville, May 4, 1863; 13. Beverly Ford, June 9, 1863; 14. Ashley's Gap, June 19 and 21, 1863; 15. Gettysburg, July 3, 1863; 16. Williamsport, July 6, 1863; 17. Boonsboro', July 8 and 9, 1863; 18. Brandy Station, August 1 and 4, 1863; 19. Culpepper, September 13, 1863; 20. Rapidan River, September 14, 1863.

918. Battalion Colors, U. S. Corps of Cadets.

919. National Colors, U. S. Corps of Cadets.

From January 27, 1890, to August 18, 1893. *Superintendents during that time:* Colonel John M. Wilson, Corps of Engineers; Colonel O. H. Ernst, Corps of Engineers. *Commandants:* Lieut. Col. H. S. Hawkins, 23rd Infantry; Lieut. Col. S. M. Mills, 5th Artillery. *Cadet 1st Captains:* McIndoe, Summerall, Johnston and Conrad. *Cadet Adjutants:* Echols, Dickson, Hazzard, Ladue and Carson. The color was carried by the Corps of Cadets, at the unveiling of the Battle Monument at Bennington, Vermont, August, 1891; in the parade in New York City, Columbus Day, October 12, 1892; and at the review for Her Royal Highness the Infanta Eulalie of Spain, at West Point, N. Y., May 22, 1893.

920. 9th U. S. Infantry Regimental Colors.

Carried in the Mexican War.

921. 4th U. S. Infantry Regimental Colors.

Carried in the War 1861-1865. 1. Wilderness, 1864; 2. Spottsylvania, 1864; 3. North Anna River, 1864; 4. Popotomail Creek, 1864; 5. Cold Harbor, 1864; 6. Petersburg, 1864.

922. 4th U. S. Infantry Regimental Colors.

The first colors carried by the Regiment, in 1794, and carried at the battle of Tippecanoe in 1811.

The flag was presented to the Military Academy, West Point, N. Y., by Captain C. H. Carlton, 4th U. S. Infantry.

923. 39th U. S. Infantry Regimental Colors.
Carried through the Mexican War; 17 stars on flag.

924. Battalion Colors, U. S. Corps of Cadets.

925. National Colors, U. S. Corps of Cadets.

926. Battalion Colors, U. S. Corps of Cadets.

927. Cadet Colors.

928. Battalion Colors U. S. Corps of Cadets.

929. 11th U. S. Infantry Regimental Colors.
Carried through the Mexican War.

930. 14th U. S. Infantry Regimental Colors.
Carried through the Mexican War.

931. 4th U. S. Infantry Regimental Colors.
Carried in the Florida War, 1836-1837.
1. Gaines' Pen, 1836. 2. Thlonatossa Creek, April 26 and 27, 1836. 3. Okeechobee, December 25, 1837.

932. 9th U. S. Infantry Regimental Colors.
Carried in the Mexican War; 17 stars on flag.

933. 1st Regiment U. S. Light Artillery Regimental Colors.
No record.

934. Headquarters Flag, Department of the Cumberland.
War 1861-1865, Major General George H. Thomas, Commanding.

935. 23rd U. S. Infantry Regimental Colors.
No record; 17 stars on flag.

936. 23rd U. S. Infantry Regimental Colors.
No record; 17 stars on flag.

937. National Colors, U. S. Corps of Cadets.

938. 21st U. S. Infantry Regimental Colors.
Carried in the Mexican War.

939. 11th U. S. Infantry Regimental Colors.
Carried in the Mexican War; no stars.

940. 44th U. S. Infantry Regimental Colors.

Carried in the Mexican War; 17 stars on flag.

941. 11th U. S. Infantry National Colors. 1st Battalion.

Carried in the War 1861-1865. Battles on flag:

1. Yorktown, May 4, 1862. 2. Gaines' Mill, June 27, 1862. 3. Malvern Hill, July 1, 1862. 4. Antietam, September 17, 1862. 5. Fredericksburg, December 13, 1862. 6. Chancellorsville, May 1, 2 and 3, 1863. 7. Gettysburg, July 2 and 3, 1863. 8. Manassas, July 21, 1863.

942. U. S. Flag, carried by the 13th U. S. Missouri Volunteer Infantry Regiment.

At the battle of Fort Donaldson and at the battle of Shiloh. "On Sunday morning, April 6, 1862, the flag was hoisted at sunrise in camp at Shiloh; soon after the rattle of musketry was heard along the advanced lines, and then the long roll. An order came for me to advance with my regiment to the bridge near Shiloh church; we started, leaving our camp flag flying and a few sick men to protect the same; of these sick one was a boy named Beem, of the color guard; the retreating troops had passed through my camp disorganized; those I left behind all ran for the river; cannon balls were flying and one passed through the flag. That the flag might not fall into the hands of our enemies, the young man, Beem, hauled it down, undressed himself, wrapped it around his body, dressed himself in larger garments, and made his way to me in line of battle where he arrived in the thick of the fight, and in time to save the Regimental Flag. For these two heroic deeds I had the young soldier boy commissioned as an officer. Professor Church, on that Sunday morning my position was not quite so peaceful as you had it at the Point that day. We lost 89 killed and wounded in about an hour, and among them all my field and staff officers. When you see this flag it may remind you of your classmate of 1828. Most truly and your friend and classmate, Crafts J. Wright."

This flag was presented June 24, 1874, to the Military Academy, West Point, N. Y., by Colonel Crafts J. Wright, of Glendale, Ohio, Commanding 13th U. S. Regiment Missouri Volunteer Infantry, War 1861-1865.

943. United States Flag.

This flag was carried through the Mexican War, with Duncan's battery, and was in the following engagements: 1. Palo Alto, May 8, 1846; 2. Resaca De La Palma, May 9, 1846; 3. Monterey, September 21, 22 and 23, 1846; 4. Vera Cruz, March 29, 1847; 5. Cerro Gordo, April 19, 1847; 6. Churubusco, August 20, 1847; 7. Chapultepec, September 12, 1847; 8. City of Mexico, September 12, 13 and 14, 1847.

Presented to the Military Academy by Brigadier General William F. Barry, Chief of Artillery, Army of the Potomac.

945. 15th U. S. Infantry Regimental Colors.

Carried in the Mexican War; 17 stars on flag.

946. National Colors, U. S. Corps of Cadets.

947. National Colors, U. S. Corps of Cadets.

948. 32nd U. S. Infantry Regimental Colors.

Carried in the Mexican War; 17 stars on flag.

949. National Colors, U. S. Corps of Cadets.

950. 13th U. S. Infantry Regimental Colors.

Carried in the Mexican War; 17 stars on flag.

951. Part of Mexican Flag.

Captured by the U. S. Army, in Mexican War.

951½. Small Mexican Flag.

Yellow ground with crown, a cactus and some animal, with other devices on flag. Captured by the U. S. Army, in Mexican War.

952. Mexican Flag.*

952½. Mexican Flag.*

953. Part of Mexican Flag.*

954. Part of Mexican Flag.*

955. National Colors, U. S. Corps of Cadets.

956. Mexican Flag.*

* Captured by the U. S. Army, in Mexican War.

957. Mexican Flag.*

958. Mexican Flag.*

959. Mexican Flag.*

960. Mexican Flag.*

961. Mexican Flag.*

962. Headquarters Flag, Army of the Cumberland.
War 1861-1865, Major General George H. Thomas, Commanding.

963. 6th U. S. Infantry Marker.
Carried in the Mexican War.

964. Mexican Flag.*

965. Mexican Flag, of the Castle of Chapultepec.
Captured by the 3rd Division U. S. Army, commanded by Major General Pillow, U. S. A., September 12, 1847.

966. Mexican Flag.*

967. Mexican Flag.*

968. Mexican Flag.*

969. Mexican Flag.
Captured by the U. S. Army, at San Antonia, Lower California, March 15, 1848.

970. Mexican Flag.*

971. Mexican Flag.*

972. Mexican Flag.*

973. 6th U. S. Infantry Marker.
Carried in the Mexican War.

974. 6th U. S. Infantry Marker.
Carried in the Mexican War.

---

* Captured by the U. S. Army, in Mexican War.

975. 6th U. S. Infantry Marker.

Carried in the Mexican War.

976. 3rd U. S. Infantry Regimental Colors.

Carried through the Mexican War, 1846-1847.

977. 3rd U. S. Infantry Regimental Colors, 1st Division, 5th Corps, Army of the Potomac.

Carried through the War, 1861-1865.

978. 6th U. S. Infantry Regimental Colors.

Carried at the battle of Okeechobee, Florida.

979. Battle Flag, Battery "L," 1st U. S. Artillery.

This flag was carried through the War, 1861-1865. Battles on flag: 1. Santa Rosa Island, Florida, October 9, 1861; 2. Fort Pickens, Florida, November 22 and 23, 1861; 3. Fort Pickens, Florida, June 1, 1862; 4. Porters Bridge, La., August 13, 1863; 5. Irish Bend, La., April 13 and 14, 1863; 6. Vermillion Bayou, La.; 7. Port Hudson, La., May 27, 1863; 8. Jackson, La.; 9. Donaldsville, La.; 10. Port Hudson, La., July 8; 11. Vermillion Bridge, La.; 12. Carrion Crow, La.; 13. Red River Expedition, La.; 14. Natchitoches; 15. Sabine Cross Roads, La., April 8, 1864; 16. Pleasant Hill, La., April 9, 1864; 17. Cane River Ford; 18. Marksville; 19. Smithfield, Va., May 12, and June 14, 1863; 20. Winchester, Va., September 19, 1864; 21. Fisher's Hill, Va., September 22, 1864; 22. Mount Jackson; 23. Newmarket, Va., September 25, 1864; 24. Port Republic; 25. Strasburg; 26. Cedar Creek, Va., October 19, 1864.

980. 4th U. S. Infantry Regimental Colors, Silk.

Presented to the regiment by the Ladies of New Orleans, La., after the Mexican War.

981. 6th U. S. Infantry Marker.

Carried in the Mexican War.

982. 25th U. S. Infantry Regimental Colors.

No record; no stars on flag.

983. Flag of Battery "M," 2nd U. S. Artillery.

Carried through the War, 1861-1865. 1. Bull Run, Va., July 21, 1861; 2. Yorktown, Va., May 4, 1862; 3. Williamsburg, May 5, 1862; 4. Hanover Court House, May 27, 1862; 5. Seven Days' Battle, June, 1862; 6. Malvern Hill (1st), July 1, 1862; 7. Malvern Hill (2nd), August 5, 1862; 8. South Mountain, September 12, 1862; 9. Antietam, September 17, 1862; 10. Williamsport (1st), September 19, 1862; 11. Martinsburg, October 2, 1862; 12. Philimont, November 2, 1862; 13. Union, November 3, 1862; 14. Upperville, November 4, 1862; 15. Barbers Cross Roads, November 6, 1862; 16. Amesville, November 11, 1862; 17. Nolan's Ford, November 12, 1862; 18. Fredericksburg, December 13, 1862; 19. Chancellorsville, May 1 and 2, 1863; 20. Stoneman's Raid, May, 1863; 21. Beverly Ford, June 9, 1863; 22. Hanover, Pa., June 30, 1863; 23. Hunterstown, Pa., July 2, 1863; 24. Gettysburg, Pa., July 2 and 3, 1863; 25. Monterey Springs, July 4, 1863; 26. Williamsport (2nd), July 6, 1863; 27. Boonsboro', Md., July 8, 1863; 28. Hagerstown, Md., July 12, 1863; 29. Falling Waters, July 14, 1863; 30. Battle Mountain, July 24, 1863; 31. James City, Va., October 10, 1863; 32. Brandy Station, October 11, 1863; 33. Buckland Mills, October 19, 1863; 34. Morton's Ford, November 26, 1863; 35. Craig's Meeting House, May 5, 1864; 36. Sheridan's Raid, May, 1864; 37. Yellow Tavern, May 11, 1864; 38. Strawberry Hill, May 12, 1864; 39. Sheridan's Raid, June, 1864; 40. Trevillian Station, June 11, 1864; 41. Trevillian Station, June 12, 1864; 42. Summit Point, August 15, 1864; 43. Kearneysville, August 25, 1864; 44. Winchester, September 7, 1864; 45. Opequan, September 13, 1864; 46. Lacey's Springs, December 20, 1864; 47. Winchester, March 2, 1865; 48. Dinwiddie Court House, March 31, 1865; 49. Deep Creek, April 3, 1865; 50. Sailors Creek, April 6, 1865; 51. Appomattox Station, April 8, 1865; 52. Appomattox Court House, April 9, 1865.

Presented to the Military Academy by A. C. M. Pennington, Brevet Colonel 2nd U. S. Artillery.

984. 11th U. S. Infantry Regimental Colors, 1st Battalion.

Carried through the War 1861-1865. Battles on flag: 1. Siege of Yorktown, April, 1862; 2. Gaines Mill, June 27, 1862; 3. Malvern Hill, July 1, 1862; 4. Bull Run (2nd), August 30, 1862; 5. Antietam, September 17, 1862; 6. Leetown, October 17, 1862;

7. Fredericksburg, December 13, 1862; 8. Chancellorsville, May 1, 1863; 9. Gettysburg, July 1, 1863; 10. Rappahannock Station, November 7, 1863; 11. Mine Run, November 27, 1863; 12. Wilderness, May 5, 1864; 13. Spottsylvania (1st), May 8, 1864; 14. Spottsylvania (2nd), May 12, 1864; 15. North Anna River, May 23, 1864; 16. Tolopotomy Creek; 17. Bethesda Church, June 1 and 3, 1864; 18. Petersburg, June 18, 1864; 19. Weldon Railroad, August 18, 1864; 20. Chapel Hill, October 1, 1864; 21. Hatchers Run, February 17, 1865. This silk flag was presented to the regiment by a sister of Colonel Floyd-Jones.

Presented to the Military Academy by Colonel Floyd-Jones, Commanding 11th U. S. Infantry, February 11, 1872. 13 stars on flag.

985. Battle Flag of Batteries "B" and "L," 2nd U. S. Artillery.

Consolidated and equipped as horse artillery, March 16, 1862. 1. Fairfax Court House, May 31, 1861; 2. Gaines Mill, January 27, 1862; 3. Siege of Yorktown, April, 1862; 4. Malvern Hill (1st), July 1, 1862; 5. Malvern Hill (2nd), August 5, 1862; 6. South Mountain, September 12, 1862; 7. Antietam, September 17, 1862; 8. Shepherdstown Ford, September 19, 1862; 9. Halltown, September 26, 1862; 10. Warrenton; 11. Williamsburg, May 4 and 5, 1863; 12. Chancellorsville, May 4, 1863; 13. Stoneman's Raid, May, 1863; 14. Hogan's House, May 23, 1863; 15. Ellison's Mills; 16. Leech's Station; 17. Mechanicsville; 18. Corts Mill; 19. Beverly Ford, June 9, 1863; 20. Gettysburg, July 1 and 2, 1863; 21. Hanoverton, July 2, 1863; 22. Falling Waters, July 9, 1863; 23. Funkstown, July 14, 1863; 24. Chester Gap, July 22, 1863; 25. Brandy Station (1st), August 1, 1863; 26. Brandy Station (2nd), August 4, 1863; 27. Culpepper, September 13, 1863; 28. Norton's Ford, October 11, 1863; 29. Stevensburg; 30. Brandy Station (3rd); 31. Oak Shades; 32. Bealton; 33. Todd's Tavern (1st), May 7, 1864; 34. Todd's Tavern (2nd), May 8, 1864; 35. Sheridan's Raid, May, 1864; 36. Yellow Tavern, May 11, 1864; 37. Meadow Bridge; 38. Salem Church; 39. Trevillian Station, June 11 and 12, 1864; 40. Newtown; 41. Deep Bottom, July 28, 1864; 42. Front Royal; 43. Milford (1st), September 27, 1864; 44. Milford (2nd); 45. Waynesboro, September 27, 1864; 46. Bridgewater; 47. Tumble Run; 48. Cabin Hill; 49. Cedar Creek (1st), October 19, 1864; 50. Cedar Creek (2nd).

Presented to the Military Academy, by Captain J. M. Robertson, 2nd U. S. Artillery, Brevet Brigadier General, U. S. Army.

986. 3rd U. S. Infantry National Colors.

No record.

986a. 3rd U. S. Infantry National Colors.

No record.

987. 3rd U. S. Infantry Regimental Colors, Army of the Potomac.

Carried at the first battle of Bull Run, Va., July 21, 1861.

988. 21st U. S. Infantry Regimental Colors.

No record.

989. 4th U. S. Infantry Regimental Colors.

Carried in the War 1861-1865. 1. Siege of Yorktown, March and April, 1862; 2. Gaines Mill, June 27, 1862; 3. Malvern Hill, July 1, 1862; 4. Bull Run, August 30, 1862; 5. Antietam, September 17, 1862; 6. Fredericksburg, December 13, 1862; 7. Chancellorsville, May 4, 1863; 8. Gettysburg, July 1 and 2, 1863; 9. Wapping Heights, July 22, 1863.

990. 22nd U. S. Infantry Regimental Colors.

No record.

991. 23rd U. S. Infantry Regimental Colors.

No record.

992. U. S. Garrison Flag.

The first American flag hoisted at Vera Cruz, and at the Citadel of Mexico, in the War 1846-1847, on the capture of the City of Mexico by the United States Army. It was taken down by the 3rd U. S. Artillery, Commanded by Captain Burke, under a salute of thirty guns fired from the captured pieces, and forwarded to the Adjutant General at Washington, D. C., by order of Major General Worth, U. S. Army, by George Deas, Assistant Adjutant General, 1st Division, June 7, 1848. The halyards around this flag carried the Mexican flag on the National Palace of the City of Mexico, and by the same halyards, the American ensign was carried on September 14, 1847.

Presented by Major General Worth, U. S. A., to the U. S. Military Academy.

993. National Colors, U. S. Corps of Cadets.

994. 17th U. S. Infantry Regimental Colors.

No record.

995. 3rd U. S. Infantry Regimental Colors.

Carried with 1st Brigade, 2nd Division, 5th Corps, Army of the Potomac from 1862 to 1865. Shot through the staff at the Battle of Gettysburg, July 2, 1863.

997. 4th U. S. Infantry Regimental Colors.

Carried in the War, 1861-1865.

1. Wilderness, Va., May 4, 5 and 6, 1864; 2. Spottsylvania Court House, May 12, 1864; 3. Lee's Surrender, April, 1865.

998. 1st U. S. Light Artillery Regimental Colors.

Carried in the Mexican War; 17 stars on flag.

999. 13th U. S. Infantry Regimental Colors.

No record.

1000. 1st U. S. Infantry Regimental Colors.

Carried in the Mexican War; 17 stars on flag.

1002. 22nd U. S. Infantry Regimental Colors.

Carried in the Mexican War; 18 stars on flag.

1003. Headquarters Flag, Cavalry Corps, Army of the Potomac.

Carried through the War 1861-1865.

1005. 4th U. S. Infantry Regimental Colors.

Carried through the Mexican War, 1846-1847.

1. Palo Alto, May 8, 1846; 2. Resaca de la Palma; May 9, 1846; 3. Monterey, September 21, 22 and 23, 1846; 4. Siege of Vera Cruz, March, 1847; 5. Churubusco, August 20, 1847; 6. Molino del Rey, September 8, 1847; 7. Chapultepec, September 12, 1847; 8. City of Mexico, September 12, 13 and 14, 1847.

1006. 8th U. S. Infantry Regimental Colors.

Carried through the Mexican War, 1846-1847.

It was carried by Lieutenant James Longstreet, Regimental Adjutant in the storming of Churubusco, and was the first flag planted on the fortifications by Captain J. V. Bomford and Lieutenant Longstreet, and the second flag planted on the battlements of Chapultepec, by Lieutenant George E. Pickett, and it is claimed by the Regiment to have been the first flag to enter the City of Mexico. This flag was carried by the Regiment at Ciralvo, Mexico, and in the following engagements:

1. Monterey, September 21, 22 and 23, 1846; 2. Vera Cruz, March 29, 1847; 3. Cerro Gordo, April 18, 1847; 4. Battles of the Valley; 5. Churubusco, August 20, 1847; 6. Chapultepec, September 12, 1847; 7. City of Mexico, September 13 and 14, 1847.

Presented to the Military Academy, by Major M. Cogswell, 8th U. S. Infantry. 28 stars on flag.

1007. 8th U. S. Infantry Regimental Colors.

Carried in the Florida and Mexican Wars. The Regiment was organized under this flag.

1. Palo Alto, May 8, 1846; 2. Resaca de la Palma, May 9, 1846.

Presented to the Military Academy by Major M. Cogswell, 8th U. S. Infantry. 26 stars on flag.

WAR DEPARTMENT,
WASHINGTON, December 28, 1848.

SIR:

The President of the United States, under the law of 1814, which provides for the preservation and display of trophies of War, has directed that the flags, standards and colors taken by the Army of the United States in the war with Mexico, be deposited in the Military Academy. I have, therefore, placed them in the hands of Archibald Campbell, Esqr., Chief Clerk of this Department, by whom they will be delivered to you.

Among the considerations which render the Military Academy at West Point an appropriate depository of the trophies of the successive victories of our arms in Mexico, is the admitted fact that the graduates of that institution contributed in an eminent degree to our unexampled career of success.

Very respectfully, your obdt. servt.,

(Sgd.) W. L. MARCY,
Secretary of War.

Captain HENRY BREWERTON,
Superintendent Military Academy,
West Point, New York.

1122. National Colors, U. S. Corps of Cadets.

From March, 1893, to January, 1897. *Superintendent during that time:* Colonel O. H. Ernst, Corps of Engineers. *Commandant:* Lieut. Col. S. M. Mills, 5th Artillery. *Cadet 1st Captains:* Kutz, Mitchell, Ames, Lott and Morgan. *Cadet Adjutants:* Hazzard, Carson, Smith, King and Cheney.

1123. Battalion Colors, U. S. Corps of Cadets.

From May, 1894, to January, 1897. *Superintendent during that time:* Colonel O. H. Ernst, Corps of Engineers. *Commandant:* Lieut. Col. S. M. Mills, 5th Artillery. *Cadet 1st Captains:* Mitchell, Ames, Lott and Morgan. *Cadet Adjutants:* Carson, Smith, King and Cheney.

FLAGS OF THE FOLLOWING NATIONS.

1187. United States.
1124. Venezuela.
1125. Montenegro.
1126. Congo.
1127. Turkey.
1128. Scotland.
1129. Argentine Republic.
1130. Italy.
1131. Liberia.
1132. Roumania.
1133. Papal States.
1134. Holland.
1135. Great Britain.
1136. Greece.
1137. Ireland.
1187. United States.
1138. Brazil.
1139. Salvador.

1140. Canada.
1141. Paraguay.
1142. Burmah.
1143. Belgium.
1144. Yacht Ensign.
1145. Mexico.
1146. Nicaragua.
1147. Cochin China.
1148. Morocco.
1149. Union Jack.
1150. Servia.
1151. United States of Columbia.
1152. Japan.
1153. Samoa.
1187. United States.
1154. Germany.
1155. China.
1156. Peru.
1157. Chile.
1158. Norway.
1159. Orange Free State.
1187. United States.
1160. Honduras.
1161. New Zealand.
1162. Korea.
1163. Austro-Hungary.
1187. United States.
1164. Ecuador.
1166. Portugal.
1167. Guatemala.

1168. Bolivia.
1187. United States.
1169. Costa Rica.
1170. Spain.
1171. Persia.
1172. Cuba.
1187. United States.
1173. France.
1174. Dominican Republic.
1175. Denmark.
1176. Russia.
1177. Hawaiian Islands.
1178. Sweden.
1187. United States.
1179. Switzerland.
1180. Bulgaria.
1181. Uruguay.
1182. Siam.
1187. United States.
1183. Hayti.
1184. Quarantine.
1185. Secretary of War.
1186. President.
1187. United States.
1188. Secretary of Navy.
1189. Revenue.

FLAG-STAFFS.

1190.

(Copy of letter from General Scott accompanying the trophies.)

WEST POINT, Sept. 17, 1848.

SIR:

I offer thro' you to the United States Military Academy, sections of seven flag-staffs taken by the gallant Army of the United States in the campaign that commenced at Vera Cruz and terminated in the capital of Mexico.

Four other staffs captured with the strong works, viz: the intrenched camp of Contreras, the Convent of Churubusco, the Bridge-Head of Churubusco, and the Citadel of Mexico, were divided into small individual trophies, by our officers and men, before my wishes on the subject had become generally known.

Of course, all captured flags, colors, &c., were as National trophies sent to Washington.

The following inscriptions have been placed on the respective objects:

1. Part of the flag-staff of the castle of San Juan de Ulloa, Vera Cruz, taken by the American Army, March 29, 1847.
2. Part of the flag-staff of Fort San Jago, Vera Cruz, taken by the American Army, March 29, 1847.
3. Part of the flag-staff of Fort Conception, Vera Cruz, taken by the American Army, March 29, 1847.
4. Part of the flag-staff of Cerro Gordo, taken by the American Army, April 18, 1847.
5. Part of the flag-staff of the castle of Perote, taken by the American Army, April 23, 1847.
6. Part of the flag-staff of the fortress of Chapultepec, taken by the American Army, September 13, 1847.
7. Part of the flag-staff of the National Palace of Mexico, taken by the American Army, September 14, 1847.

At the foot of each inscription, this line is added:—The plates and caps (all brass) made of the mountings of captured muskets.

It may be worth stating that the caps and plates were made in the Citadel of Mexico by the mechanics of the Army.

As under Providence, it was mainly to the Military Academy that the United States became indebted for those brilliant achievements and other memorable victories, in the same war, I have a lively pleasure in tendering the seven trophies (semi-National) to the mother of so many accomplished soldiers and patriots.

With high respect and esteem, I remain, yours faithfully,

(Signed) WINFIELD SCOTT.

Captain HENRY BREWERTON,
Superintendent U. S. Military Academy.

These flag-staffs are numbered as follows:

1191. Part of the flag-staff of the castle of San Juan de Ulloa, Vera Cruz.

1192. Part of the flag-staff of Fort San Jago, Vera Cruz.

1193. Part of the flag-staff of Fort Conception, Vera Cruz.

1194. Part of the flag-staff of Cerro Gordo.

1195. Part of the flag-staff of the castle of Perote.

1196. Part of the flag-staff of the fortress of Chapultepec.

1197. Part of the flag-staff of the National Palace of Mexico.

1198. Portion of the flag-staff from Fort Wagner, South Carolina.

War 1861-1865.

1199. Portion of the flag-staff of Fort Sumter, South Carolina.

When fired on April, 1861.

SECTION IV—PORTABLE ARMS.

The guns of this section have not been classified and separated; for instance, according to lock, bore or loading; except in the case of the modern magazine rifles, which are contained in the two revolving arm racks in the center aisle of the museum.

Portable Fire Arms, were invented about the middle of the 14th century. At first, they consisted simply of a tube of iron or copper fired from a support. They were loaded with lead balls and touched off by a lighted match held in the hand.

They weighed from 25 to 75 lbs. and two men were required to serve them. The difficulty of loading and inaccuracy of fire prevented their coming rapidly into use, so that the crossbow was carried for a long time as the principal arm for infantry.

Breech-Loading Small Arms, with removable chamber pieces, were introduced about the same time, but were thrown aside for want of strength and solidity. During the Revolution a breech-loader, the Ferguson rifle, was in use, closed by a screw turned in from below across the rear of the barrel. The first American breech-loading arm was the Hall, specimens of which are shown in this section. The earlier modern breech-loaders used paper cartridges and the later ones metallic cartridges.

Locks.—*The Match Lock*, consisting of a lever pressed down by hand until the lighted match at its extremity touched the priming in the firing pan, was next used.

The Wheel Lock, consisting of a grooved wheel of steel which acted through a half revolution on a piece of iron and antimony placed

near the priming charge of powder, which was ignited by sparks therefrom, replaced the match lock in 1517.

The Flint Lock was derived from the wheel lock by substituting flint for the alloy of iron and antimony, and a steel battery for the wheel. It was introduced into the French army in 1680, and continued in military use until about 1842, when it was replaced by the percussion lock, well known.

Rifles.—The rifle with straight grooves, steadying the bullet, was first used at Leipsic in 1498. Later the greater accuracy of spiral grooves was accidently discovered. About 1600, the rifle, firing spherical balls, began to be used as a military weapon. In 1729, better results were attained by using elongated bullets. The difficulty of loading, ordinarily accomplished by striking on a stout ramrod with a mallet, prevented general use of the rifle in warfare. In this country, the rifle has always been a favorite weapon, being in common use among the Americans during the Revolution. Military rifles were manufactured as early as 1814 at Harper's Ferry Armory, but the mass of our infantry was armed with smooth-bore muskets until 1855.

PORTABLE ARMS.

[O. N. indicates old number marked on butt of gun.]

1300. Air gun, incomplete.

Presented to the Military Academy by Mr. Van Nostrand, New York.

1301. Colt's magazine carbine, cal. .44″.

This gun is operated by a handle sliding on the magazine tube under the barrel, but the breech action is a bolt system, instead of the falling block. A bar, attached to the slide, works a lever connected with a cam-latch, which is hinged at its forward end to the under side of the bolt towards the rear. When the bolt is closed, the rear end of this cam-latch drops into a depression under the bolt in the bottom of the frame, and abuts against a shoulder in the frame, securing the bolt. Drawing back the handle raises the cam-latch over the shoulder and then pushes back the bolt so freed. Forcing the handle to the front draws the bolt forward and finally swings the cam-latch down again, locking the bolt. A spring extractor on the bolt withdraws the empty shell. A sliding carrier block, moving like that in the Winchester and Vetterlin, transfers cartridges from the magazine.

1302. U. S. breech-loading Springfield rifled carbine, model 1884, cal. .45″.

In 1865, Mr. E. S. Allin, master armorer of the National Armory, Springfield, Mass., submitted to the Ordnance Department a model Springfield breech-loader. In 1866, a few guns made on this model were placed in the hands of troops but did not fulfill the requirements of the military service. Changes suggested by officers and others at the Armory resulted in the models of 1866, 1868 and 1870. The 1868 model was the muzzle-loading rifle musket, model 1863, altered to a breech-loader. In 1873, a Board of Officers, appointed in pursuance to Act of Congress for the purpose of selecting a breech-loading system for the muskets and carbines of the United States military service reported in favor of the "Springfield" system. The minor details as to the caliber, form of chamber, ammunition, etc., were determined by a Board of Ordnance Officers, convened for that purpose. This resulted in

the Springfield rifle, carbine and cadet rifle, model 1873. Improvements made resulted in the model of 1884 rifle, which fired a lead bullet of 500 grains with 70 grains black powder giving a muzzle velocity of about 1300 ft. per second and a maximum range of 3500 yards.

1303. Spencer repeating breech-loading rifled carbine, cal. .52″, skeletonized.

(O. N. 47.) This gun was introduced in 1860. It was the earliest magazine gun used in actual war. Ninety-four thousand one hundred and fifty-six were purchased for use in the army during the Civil War. Used a rim-fire metallic cartridge. A lever underneath, swinging down and forward, draws down the breech-block and swings it backward far enough for a cartridge to slip over the block from the magazine in rear, a spring finger above the mouth of the magazine keeping the cartridge from slipping out. Swinging the lever backward pushes the cartridge in and closes the breech. Fired by an independent hammer striking a slide in the block and driving it against the rim of cartridge. By a button underneath, the swing of the lever can be limited so that a cartridge will not be admitted from the magazine, and the gun can then be used as a single loader. A narrow plate hinged to the block serves as extractor, and the shell is forced out by sliding up the inclined finger which covers the magazine. A tube containing a spiral spring can be drawn out from the rear, allowing cartridges to be dropped into the magazine. Returning the tube to place brings the pressure of the spring upon the cartridges to force them forward. The spring has a head, or "follower," at the end to bear upon the cartridge, and this is common in all spring magazines.

1304. U. S. pistol rifled muzzle-loading carbine, Maynard primer, model 1856, cal. .58″.

(O. N. 46.) The Maynard primer consists of pellets of fulminate placed at regular intervals between narrow strips of paper which are made to enclose the fulminate entirely and resemble a piece of narrow tape. This is coiled in a small chamber in the lock plate, from whence it is fed forward by a wheel operated by a hammer so as to bring a pellet on top of the nipple at each discharge, the hammer having a sharp edge just in rear of the nipple that cuts off the tape containing the discharged pellet at the instant of striking it.—*Norton's American Breech-Loading Small Arms.*

1305. Prussian needle breech-loading rifled carbine, cal. .56″.

(O. N. 45.) The front sight is protected by guards on either side projecting above the barrel. These guards stand away from the sight far enough not to interfere with aim. This device would be useful where no sight cover is used. Presented by the Prussian Government to the United States in 1868. This gun was adopted by the Prussian Government in 1847. It fires a paper cartridge, front ignition, the needle striking a pellet of fulminate in the base of the paper sabot which surrounds the ball. There is no gas-check except that resulting from the mechanical fit of the bolt. This is the earliest self-primed cartridge adopted for military service, and the gun is the first example of the bolt system now so common in Europe. The bolt is pushed in and turned, like a common door-bolt, to secure it.

1306. Austrian muzzle-loading rifle carbine, percussion, cal. .72″.

(O. N. 44.)

1307. Starr's breech-loading rifled carbine, metallic ammunition, model 1858, cal. .52″.

(O. N. 43.)

1308. Starr's breech-loading rifled carbine, percussion, model 1858, cal. .54″.

(O. N. 42.) By depressing the lever, the brace in rear of breech-block is drawn downward by means of a link connecting it with breech-block. The breech-block is simultaneously caused to revolve downward and backward. The piece is fired by an ordinary side-lock. The face of the breech-block is countersunk annularly, so as to give a conical bearing against the butt of the barrel, probably to serve as gas-check. 25,603 of these arms were purchased for use in the army during the Civil War.

1309. Spencer repeating breech-loading rifled carbine, model 1860, cal. .52″.

(O. N. 41.)

1310. Cosmopolitan breech-loading rifled carbine, model 1859, cal. .50″.

(O. N. 40.) Marked Union Rifle on receiver. By depressing the lever, the front section of the breech-block slides back until a cylindrical tenon on its face is clear of the chamber. It then revolves about an axis in front and below it, until the chamber is exposed. The strain of the discharge is transferred by the head of the lever to the abutment on the frame. The arm uses a paper or linen cartridge, ignited by a percussion cap. An apron above the block protects the parts from dust, etc., and helps to guide the cartridge in loading. Used in Civil War.

1311. Remington breech-loading rifled carbine for metallic cartridge, model 1869, cal. .50″.

(O. N. 39.) Marked Springfield, 1870, on lock-plate. In this system, the breech is closed by a block revolving backward on an axis below and perpendicular to the barrel. A cylindrical shoulder at the base of the hammer in rear is made to support and lock the block upon firing.

1312. Remington breech-loading rifled carbine for metallic cartridge, cal. .50″.

(O. N. 38.) Marked Remington, Ilion, N. Y., Pat. Dec. 23, 1863.

1313. Symmes breech-loading rifled carbine, percussion, cal. .54″.

(O. N. 37.) For paper cartridge, has primer lock similar to Maynard. Breech-block rotates upward by lever beneath, around an axis at its rear perpendicular to axis of piece. This brings hole through lock in connection with bore, so that a cartridge can be inserted. This gun has a box in butt with a tool in it. The bore of this gun is of pentagonal cross section.

1314. U. S. Breech-loading Springfield rifled carbine, model 1870, cal. .50″.

(O. N. 36.) The Springfield breech-mechanism consists of a receiver screwed to the breech of the barrel; and the breech-block when it closes the breech is in the receiver. In this position, the block is attached to the receiver by a cam, operated by a thumb

piece. Upon opening, the block revolves up and forward about a hinge in front and on top of the barrel. At the end of this motion, the forward end of the block bears against the spring extractor, ejecting the cartridge in connection with the ejector stud in bottom of receiver. Unless the block is closed, the hammer cannot strike the firing pin. The pin goes through the block from hammer nose to center of bore.

1315. Joslyn breech-loading rifled carbine for metallic cartridge, model 1862, cal. .54″.

(O. N. 35.) Opens by turning block to the left. Extractor on block.

1316. Warner breech-loading rifled carbine for metallic cartridge, cal. .50″.

(O. N. 34.) Marked Ames Warner, Springfield, Mass. Warner's patent on receiver. Bronze breech-block, containing firing pin, rotates on axis, parallel to axis of bore, on right side of the receiver. Block held in firing position by a spring catch. Cartridge case ejected by an extractor moving longitudinally in the bottom of the receiver and worked by hand by means of a lug underneath.

1317. Colt's revolving percussion smooth-bore carbine, cal. .53″.

(O. N. 24.)

1318. Cosmopolitan breech-loading rifled percussion carbine, model 1862, cal. .50″.

(O. N. 32.)

1319. Sharp's breech-loading rifled percussion carbine, paper cartridge, model 1852, cal. .52″.

(O. N. 31.) Box in butt of gun. Closed by a block sliding vertically across rear of barrel, operated by a lever below. Percussion cap and nipple. Edge of block sharp to cut off rear of paper cartridge. Gas-check formed by undercut hollow in face of block. Sharp's guns were used in the U. S. Army as early as 1846, in the Mexican War, and during the Rebellion.

1320. Merrill breech-loading rifled carbine, Maynard's primer lock, cal. .54″.

(O. N. 30.) Marked S. Remington, Ilion, N. Y. on lock plate, and Merrill Latrobe & Thomas, Baltimore, Md. Box with extra nipple in it, in butt of gun. Paper cartridge. Opens by throwing forward top lever. This rotates a cylindrical shaft placed perpendicular to axis of bore in solid receiver so as to bring an opening in shaft in line with the bore of the gun. The cartridge is then pushed into place by a piston worked by hand against the action of a spring which withdraws piston. The breech is then closed by throwing back the top lever which turns the shaft. Hole through nipple runs through solid receiver communicating with bore near rear end of cartridge.

1321. Merrill breech-loading rifled percussion carbine, model 1863, cal. .54″.

(O. N. 29.) Marked 1863, J. H. Merrill, Balto., Pat. July, 1858. It has a spring-catch engaging with rear sight base. Also, an ordinary side-lock meant for prepared paper or skin ammunition. No extractor used, as cartridge is all consumed. Breech plug faced with copper, probably to serve as gas-check. 14,495 Merrill carbines were purchased for use of the army during the Civil War.

1322. Jenks' breech-loading smooth-bore percussion carbine, model 1842, cal. .52″.

(O. N. 28.) Marked, U. S. N., 1842. Paper cartridge, hammer on side of barrel. Opened by drawing back top lever. By means of a link this draws back a sliding breech-plug, and exposes a round hole in the top of the barrel a little larger than the ball. The ball is inserted through this, and allowed to run forward to its seat. The powder is then poured in and pressed forward by reversing the movement of the lever.

1323. Ballard breech-loading rifled carbine for metallic cartridge, cal. .42″.

(O. N. 33.) By depressing a lever, the breech-block is caused first to recede from the barrel, and then to drop downward, revolving about a shifting horizontal axis at its lower and rearmost corner. Hammer and lock concealed in the breech-block. Rim-fire cartridge. The

cartridge shell is extracted by means of a sliding extractor beneath the barrel, moved independently by hand, by means of a finger-piece projecting beneath the tip stock. Depressing the stock leaves the hammer at half-cock. Block cannot be depressed when hammer is cocked. Fifteen hundred of these guns were purchased for use in the army during the Civil War.

1324. Smith breech-loading rifled percussion carbine, paper cartridge, model 1857, cal. .50″.

(O. N. 26.) Barrel connected with butt by a hinge below, and held above by a spring on the barrel, stretching across the joint, and fitting over a square lug on top of butt stock. Spring lifted by a lever underneath. 3,062 of these carbines purchased for use during the Civil War.

1325. Maynard breech-loading rifled percussion carbine, model 1859, cal .50″.

(O. N. 25.) The Maynard system. This arm was used to some extent in the service of the United States, but is now mainly manufactured as a sporting arm. The barrel is pivoted to the front end of that part of the stock which extends forward under the barrel, so that its rear open end can be tipped up, and the cartridge shoved in, when the barrel is brought down in front of a solid breech-piece, that holds the cartridge case in, and receives the force of the explosion.

1326. Palmer breech-loading rifled carbine, rim fire ammunition, model 1865, cal. .50″.

(O. N. 27.) Bolt gun with side-lock. Instead of being secured, like an ordinary door-bolt, as in the Needle gun and Chassepot, the bolt has a sectional screw at the rear end, engaging, when turned, with corresponding screw sections in the receiver. Essentially the same as the "French breech screw." Rim fire cartridge. Spring extractor lying on bolt and fastened to it. The bolt revolves independent of extractor. Ejection accomplished by a side-lever thrown outward by a spring as the shell passes it. Fired by ordinary side-lock, the hammer striking cartridge directly on rim. 1,001 of these arms were purchased for use of army during the Civil War.

1327. Greene's breech-loading rifled carbine, Maynard's primer, model 1854, cal. .53″.

(O. N. 23.) Marked Greene's patent June 27, 1854, on tang. By pulling on the forward trigger, the barrel may be revolved in a short sleeve, a quarter turn to the left, the lugs on each side of the rear end of the barrel disengaging from the corresponding grooves or recesses in the front of the receiver. The barrel can then be pulled forward to clear the receiver and the sleeve and barrel revolved to the right on an axis under the barrel to which sleeve is attached. The paper cartridge is then inserted and these motions reversed. The rear trigger fires the piece. The vent is continued from the receiver so as to pierce the paper cartridge when barrel is replaced.

1328. Gallager breech-loading rifled percussion carbine, model 1860, cal. .51″.

(O. N. 22.) Barrel opened at breech by lever underneath, pushing it forward. Used in Civil War.

1329. Gibbs' breech-loading rifled percussion carbine, cal. .52″.

(O. N. 21.) The lever, forming the guard, is detached from its spring catch on the small of the stock and pushed down and forward. This motion first pushes the barrel to the front and then upwards by means of a link, the barrel rotating around its axis at front end of stock and perpendicular to axis of the bore. The breech has a steel gas-check ring. The vent comes through center of breech forming a nipple for puncturing paper cartridge. Reverse motion closes the breech.

1330. Sharp's & Hankin's breech-loading rifled carbine, model 1859, cal. .54″.

(O. N. 20.) The lever, forming the trigger guard, is released from its catch and pushed down and to the front, rotating about a pin in the steel tip stock. This motion pushes the barrel to the front, the barrel sliding in grooves, by means of a link. The barrel is covered with leather.

1331. Schrader breech-loading rifled needle carbine, cal. .53″.

(O. N. 19.) The lever is detached and turned one half round to the rear. The end of the lever is attached to an axis through the tip stock perpendicular to the barrel. On this axis is a gear wheel which works on a rack on the under side of the barrel. This motion slides the barrel forward, opening breech and withdraws the needle. A reverse motion closes the breech.

1332. Lindner breech-loading percussion rifled carbine, paper cartridge, model 1859, cal. .57″.

(O. N. 18.) A sleeve on rear end of barrel has a worm thread, and is partly cut away. By turning the sleeve to the left, this screw becomes disengaged from the receiver, and the opening comes to the top, allowing the receiver to be pushed up to receive the paper cartridge. The receiver rotates on an axis at its rear, to which it is loosly fitted, allowing it to be pushed forward under action of the screw when being closed. The conical front end of the receiver is thus pushed into its conical seat in the barrel, forming a gas-check. Reverse motion closes the breech.

1333. Lindner breech-loading percussion rifled carbine, paper cartridge, model 1859, cal. .57″.

(O. N. 17.)

1334. Burnside breech-loading percussion rifled carbine, paper cartridge, model 1864, cal. .54″.

(O. N. 16.) The locking device, consisting of a barbed catch on the receiver, connected with a pivoted thumb-piece on the inner side of the guard. 55,567 of these guns were purchased for use in the army during the Civil War.

1335. Burnside breech - loading percussion rifled carbine, paper caps or tablets, model 1856, cal. .54″.

(O. N. 15.) Movable chamber, pivoted in front under barrel, held close by cover on transverse shaft, operated by side lever. Used an unprimed metallic cartridge, the front part of the shell covering the joint between the breech-block and the barrel, to prevent the

leakage of gas. Central fire; perforation in centre of base, admitting flame from cap placed on an outside nipple. In closing, the breech-block has a forward movement, so that the bullet projecting from forward end of chamber is pushed into the rear of the barrel. A number of these arms were used at one time by the United States for Cavalry.

1336. Hall's breech-loading smooth-bore percussion carbine, model 1847, cal. .52″.

(O. N. 14.) Marked, U. S. S., North Midl't'n, Conn., 1847, on breech-block. Breech-block opened by side lever.

1337. Hall's breech-loading smooth-bore percussion carbine, model 1842, cal. .52″.

(O. N. 13.) Marked, H. Ferry, U. S., 1842, on breech-block. Ten thousand of these guns were issued to U. S. troops in 1818. A muzzle-loading-chamber piece, hinged at rear in line of barrel. Could be tilted up to allow the insertion of the paper cartridge. A catch underneath holds the breech-piece down when closed. No provision for a gas-check was made in these guns. A joint admitting one thickness of writing paper, but not two, being considered tight enough to prevent the escape of gas, and yet loose enough for free manipulation.

1338. French artillery musketoon, muzzle-loading, smooth-bore, percussion-lock, model 1848, cal. .70″.

(O. N. 9.)

1339. Spanish artillery rifled musketoon, muzzle-loading, percussion, model 1861, cal. .57″.

(O. N. 12.)

1340. Spanish artillery rifled musketoon, muzzle-loading, percussion, model 1860, cal. .57″.

(O. N. 11.)

1341. German cavalry smooth-bore musketoon, percussion-lock, cal. .71″.

(O. N. 10.)

1342. U. S. Springfield rifled muzzle-loading percussion carbine, model 1854, cal. .54″.
(O. N. 8.) Marked Springfield 1854 on lock-plate.

1343. U. S. Springfield muzzle-loading percussion carbine, model 1848, cal. .56″.
(O. N. 7.)

1344. U. S. Springfield cavalry smooth-bore muzzle-loading musketoon, percussion, model 1847, cal. .69″.
(O. N. 6.)

1345. U. S. Springfield sapper smooth-bore muzzle-loading musketoon and sword bayonet, percussion-lock, model 1847, cal. .69″.
(O. N. 5.)

1346. U. S. Springfield artillery smooth-bore muzzle-loading musketoon, percussion-lock, model 1847, cal. .69″.
(O. N. 4.)

1347. English artillery rifled muzzle-loading musketoon and sabre bayonet, percussion-lock, Enfield, model 1854, cal. .58″.
(O. N. 3.)

1348. English smooth-bore flint-lock muzzle-loading musketoon, Tower, cal. .76″.
(O. N. 2.) Marked Tower, U. S., with G. R. and Crown design on lock-plate.

1349. German muzzle-loading smooth-bore flint-lock musket.
(O. N. 128.) Marked Buckmaster on lock-plate. Note safety device for hammer.

1350. Brass blunderbuss, flint-lock, smooth-bore, muzzle-loading, Griffin & Tow, 1779.
(O. N. 132.)

1351. Brass blunderbuss, flint-lock, smooth-bore, muzzle-loading.
(O. N. 131.)

1352. English smooth-bore muzzle-loading flint-lock musket. Revolutionary, King's own regiment.
(O. N. 1.) Marked Ks Regt on barrel. Jordon 1747 on lock-plate.

1353. English smooth-bore muzzle-loading flint-lock musket, cal. .71″.
(O. N. 2.)

The following 18 guns (marked *) made for the U. S. Army at various places, include the models from 1809 to 1842. The guns show changes in attaching the barrel to the stock, and in securing the bayonet. In the earliest models the barrel had no bands. It was attached by keys to the stock. The Harper's Ferry, model 1815 is a rifle, cal. .54″. The caliber of these guns ranges from .53″ to .72″.

1354. *U. S. Springfield smooth-bore muzzle-loading flint-lock musket, model 1809, cal. .55″.
(O. N. 3.) Marked 1808 on butt-plate, and 1809 Springfield on lock-plate. This is probably a Cadet musket.

1355. *U. S. smooth-bore muzzle-loading flint-lock musket and bayonet, model 1809, cal. .75″.
(O. N. 4.)

1356. *U. S. Springfield smooth-bore muzzle-loading flint-lock musket, model 1809, cal. .55″.
(O. N. 5.) Marked 1810 on butt-plate, and 1809 Springfield on lock-plate.

1357. *U. S. Harper's Ferry smooth-bore muzzle-loading flint-lock musket, model 1816, cal. .71".
(O. N. 6.) Marked Harper's Ferry 1816 on lock-plate.

1358. *U. S. Richmond, Virginia, smooth-bore muzzle-loading flint-lock musket and bayonet, model 1817, cal. .69".
(O. N. 7.) Marked Richmond 1817 Virginia Manufactory on lock-plate.

1359. *U. S. Richmond, Virginia, smooth-bore muzzle-loading flint-lock musket and bayonet, model 1818, cal. .72".
(O. N. 8.) Marked Richmond 1818 Virginia Manufactory on lock-plate.

1360. *U. S. Springfield smooth-bore muzzle-loading flint-lock musket and bayonet, model 1824, cal. .70".
(O. N. 9.) Marked Springfield 1824 on lock-plate.

1361. *U. S. Springfield smooth-bore muzzle-loading flint-lock musket and bayonet, model 1824, cal. .69".
(O. N. 10.) Marked Springfield 1824 on lock-plate.

1362. *U. S. smooth-bore muzzle-loading flint-lock musket and bayonet, model 1825, cal. .69".
(O. N. 11.) Marked 1836 on tang, and 1825 U. S. L. Pomeroy on lock-plate.

1363. *U. S. Springfield smooth-bore muzzle-loading flint-lock musket, model 1830, cal. .69".
(O. N. 12.)

1364. *U. S. Harper's Ferry smooth-bore muzzle-loading flint-lock musket and bayonet, model 1831, cal. .69".
(O. N. 13.)

1365. *U. S. Springfield smooth-bore muzzle-loading flint-lock musket and bayonet, model 1833, cal. .69".
(O. N. 14.)

1366. *U. S. New Haven smooth-bore muzzle-loading flint-lock musket, cal. .71″.

(O. N. 15.) Marked N. Haven on lock-plate.

1367. *U. S. Harper's Ferry smooth-bore muzzle-loading flint-lock musket and bayonet, model 1835, cal. .69″.

(O. N. 16.) Marked Model 1835 on barrel and tang, and Harper's Ferry 1835 on lock-plate. U. S. M. on majority of metal parts.

1368. *U. S. Springfield smooth-bore muzzle-loading flint-lock musket and bayonet, model 1842, cal. .69″.

(O. N. 17.) Marked 1842 on tang, and Springfield 1842 on lock-plate.

1369. *English smooth-bore muzzle-loading flint-lock musket, cal. .76″.

(O. N. 134.) Marked United States on butt of gun.

1370. *English smooth-bore muzzle-loading flint-lock musket, cal. .74″.

(O. N. 135.) Marked JOURJON on lock-plate, and Berthiat on barrel.

1371. *U. S. smooth-bore muzzle-loading flint-lock wall piece, cal. .74″.

(O. N. 136.) U. S. MERIEVC on barrel. This gun has a swivel.

1372. U. S. Harper's Ferry muzzle-loading rifle, flint-lock, model 1816, cal. .53″.

(O. N. 70.) Box in butt of gun.

1373. U. S. Harper's Ferry muzzle-loading rifle, flint-lock and bayonet, model 1815, cal. .54″.

(O. N. 71.) Box in butt of gun.

1374. U. S. muzzle-loading rifle, flint-lock, model 1824, cal. .54″. S. North.

(O. N. 72.)

1375. U. S. Springfield Cadet smooth-bore muzzle-loading flint-lock musket and bayonet, model 1830, cal. .57″.

(O. N. 22.) Marked 1830 on tang, Springfield 1830 on lock-plate and U. S. / E. B. on bayonet.

1376. U. S. Springfield smooth-bore muzzle-loading percussion musket and bayonet, model 1842, cal. .69″.

(O. N. 18.) Altered from the old model flint-lock to percussion in 1843. The bayonet on this gun has no clasp. Many of the altered locks were used in the first years of the Civil War, as new arms could not be supplied in sufficient quantities.

1377. U. S. Springfield smooth-bore muzzle-loading percussion musket and bayonet, model 1845, cal. .69″.

(O. N. 19.) There is a clasp on the bayonet and no rear sight on this gun. The first model of the U. S. percussion musket used in service in the Mexican War. The supply being insufficient, however, flint-locks were generally employed.

1378. U. S. Springfield smooth-bore muzzle-loading percussion musket and bayonet, model 1845, cal. .69″.

(O. N. 20.)

1379. U. S. Springfield smooth-bore muzzle-loading percussion musket and bayonet, model 1854, cal. .69″.

(O. N. 21.)

1380. U. S. Springfield Cadet smooth-bore muzzle-loading percussion musket and bayonet, model 1844, cal. .57″.

(O. N. 23.) No rear sight on this gun, and all the steel parts are browned.

1381. U. S. Springfield Cadet smooth-bore muzzle-loading percussion musket and bayonet, model 1851, cal. .58″.

(O. N. 24.) No rear sight on this gun, and all the steel parts are bright.

1382. U. S. Springfield Cadet smooth-bore muzzle-loading percussion musket and bayonet, model 1852, cal. .58″.

(O. N. 25.) Marked Springfield 1852 on lock-plate.

1383. English smooth-bore muzzle-loading percussion musket and bayonet, cal. .75″. Wilkinson & Son.

(O. N. 26.)

1384. Prussian smooth-bore muzzle-loading percussion musket and bayonet, model 1845, cal. .72″.

(O. N. 27.) Marked 705. 1819, 1820; restamped 1845.

1385. French smooth-bore muzzle-loading percussion dragoon musket, model 1842, cal. .71″.

(O. N. 28.) Marked Chatellerault.

1386. U. S. Remington rifled muzzle-loading musket and bayonet with Maynard primer, model 1855, cal. .69″.

(O. N. 29.)

1387. U. S. Springfield rifled muzzle-loading musket and bayonet, Maynard primer, model 1858, cal. .58″.

(O. N. 30.)

1388. U. S. Springfield rifled muzzle-loading percussion musket and bayonet, cal. .58″.

(O. N. 31.) This rifle, model 1861, was made in great numbers during the Civil War. It differs mainly from the model 1855 in the change in the rear sight, and the omission of the Maynard primer. The necessity for the immediate production of guns did not allow time for changing the lock-plate tools, so as to reduce the thickness of the lock-plate from the thickness required by the Maynard primer. Some of the minor details of the mountings are also altered.

1389. U. S. Springfield rifled muzzle-loading percussion musket and bayonet, model 1862, cal. .58″.

(O. N. 32.)

1390. U. S. Springfield rifled muzzle-loading percussion musket and bayonet, model 1863, cal. .58″.
(O. N. 33.)

1391. U. S. Springfield rifled muzzle-loading percussion musket and bayonet, model 1864, cal. .58″.
(O. N. 34.)

1392. C. S. A. Richmond, Virginia, rifled muzzle-loading percussion musket and bayonet, model 1863, cal. .58″.
(O. N. 35.)

1393. Lindsay rifled double-hammer muzzle-loading percussion musket and bayonet, model 1860, cal. .58″.
(O. N. 36.)

1394. U. S. Springfield Cadet rifled muzzle-loading percussion musket and bayonet, model 1853, cal. .58″.
(O. N. 37.) Marked Springfield 1853 on lock-plate, and 1853 on tang.

1395. U. S. Springfield rifled muzzle-loading musket and bayonet, Maynard primer, model 1858, cal. .58″.
(O. N. 38.)

1396. U. S. Springfield rifled muzzle-loading musket and bayonet, Maynard primer, model 1859, cal. .58″.
(O. N. 39.)

1397. French rifled muzzle-loading musket and bayonet, percussion, cal. .71″.
(O. N. 46.)

1398. French rifled muzzle-loading musket and bayonet, percussion, cal. .69″.
(O. N. 47.)

1399. Dresden rifled muzzle-loading musket and bayonet, percussion, cal. .58″.
(O. N. 48.)

1400. German rifled muzzle-loading musket and bayonet, percussion, Springfield, model 1861, cal. .58″.
(O. N. 49.)

1401. Prussian rifled muzzle-loading musket and bayonet, percussion, cal. .62″.
(O. N. 50.)

1402. Austrian rifled muzzle-loading musket and bayonet, model 1862, cal. .55″.
(O. N. 51.)

1403. Austrian rifled muzzle-loading musket and bayonet, cal. .72″.
(O. N. 52.)

1404. Austrian rifled muzzle-loading musket and bayonet, cal. .70″.
(O. N. 53.)

1405. Austrian rifled muzzle-loading musket and bayonet, percussion, cal. .71″.
(O. N. 54.)

1406. Austrian rifled muzzle-loading musket and bayonet, percussion, cal. .71″.
(O. N. 55.)

1407. Austrian rifled muzzle-loading musket and bayonet, percussion, model 1849, cal. .70″.
(O. N. 56.)

1408. Austrian rifled muzzle-loading musket and bayonet, percussion, cal. .70″.
(O. N. 57.)

1409. Austrian rifled muzzle-loading musket and bayonet, percussion, cal. .70″.
(O. N. 58.)

1410. Austrian rifled muzzle-loading musket and bayonet, percussion, cal. .70″.
(O. N. 59.)

1411. English rifled muzzle-loading musket and bayonet, percussion, model 1854, cal. .76″. Enfield.
(O. N. 40.)

1412. English rifled muzzle-loading musket and bayonet, percussion, model 1854, cal. .587″. Enfield.
(O. N. 41.)

1413. English rifled muzzle-loading musket and bayonet, percussion, model 1862, cal. .58″. Tower rifle.
(O. N. 42.) Has nipple protector held by chain on trigger guard. Many of these guns were used during War 1861-6.

1414. English rifled muzzle-loading musket and bayonet, percussion, model 1862, cal. .577″. Enfield.
(O. N. 43.) Marked on butt of gun "London Armoury, 1862."

1415. French rifled muzzle-loading musket and bayonet, percussion, cal. .72″.
(O. N. 44.) Marked "Mle 1842" on tang, and "1843" on barrel.

1416. French rifled muzzle-loading musket and bayonet, percussion, model 1846, cal. .69″.
(O. N. 45.)

1417. Austrian rifled muzzle-loading musket and bayonet, percussion, cal. .70″.
(O. N. 60.)

1418. Austrian rifled muzzle-loading musket and bayonet, percussion, cal. .69″.
(O. N. 61.)

1419. Austrian rifled muzzle-loading musket and bayonet, percussion, cal. .59″.
(O. N. 62.)

1420. Suhl rifled muzzle-loading musket and bayonet, percussion, cal. .58″.
(O. N. 63.)

1421. Suhl rifled muzzle-loading musket and bayonet, percussion, cal. .58″.
(O. N. 64.)

1422. Austrian rifled muzzle-loading musket and bayonet, percussion, cal. .58″.
(O. N. 65.)

1423. Austrian rifled muzzle-loading musket, percussion, cal. .58″.
(O. N. 66.)

1424. Austrian rifled muzzle-loading musket, percussion, cal. .55″.
(O. N. 67.)

1425. Austrian rifled muzzle-loading musket and bayonet, percussion, cal. .54″.
(O. N. 68.)

1426. Austrian rifled muzzle-loading musket and bayonet, percussion, cal. .70″.
(O. N. 69.)

1427. U. S. rifled muzzle-loading musket, percussion, cal. .54″. H. Deringer, Philadelphia.
(O. N. 73.) This appears to be converted from a flint-lock, and has very deep rifling, and also a box in butt of gun.

1428. **U. S. rifled muzzle-loading musket, percussion, model 1847, cal. .54″. Windsor, Vt.**

(O. N. 74.) This gun appears to be converted from a flint-lock, and has a box with extra percussion cap nipple in it, in butt of gun.

1429. **U. S. Harper's Ferry muzzle-loading musket, Maynard primer, model 1860, cal. .58″.**

(O. N. 75.) This gun has a box in butt of gun, and a lug for a sword bayonet on barrel.

1430. **English rifled muzzle-loading musket and sabre bayonet, percussion, model 1861, cal. .577″. Tower.**

(O. N. 76.)

1431. **English rifled muzzle-loading musket and sabre bayonet, percussion, model 1861, cal. .58″.**

(O. N. 77.)

1432. **French rifled muzzle-loading musket and sabre bayonet, model 1842, cal. .79″.**

(O. N. 78.)

1433. **French rifled muzzle-loading musket and sabre bayonet, percussion, model 1841, cal. .72″.**

(O. N. 79.)

1434. **French rifled muzzle-loading musket and sabre bayonet, cal. .71″.**

(O. N. 80.)

1435. **Austrian rifled muzzle-loading musket and sabre bayonet, percussion, cal. .71″.**

(O. N. 81.)

1436. **Austrian rifled muzzle-loading musket and bayonet, percussion, model 1862, cal. .55″.**

(O. N. 82.) This gun has two triggers.

1437. Austrian rifled muzzle-loading musket and sabre bayonet, percussion, cal. .54″.
(O. N. 83.)

1438. Austrian rifled muzzle-loading musket, percussion, model 1861, cal. .54″.
(O. N. 84.)

1439. Spanish rifled muzzle-loading musket and bayonet, percussion, model 1861, cal. .57″.
(O. N. 85.)

1440. James sporting rifle muzzle-loading with telescopic sight, cal. .43″.

1441. Double barrel French dragoon musket and bayonet, muzzle-loading smooth-bore, percussion, cal. .70″.
(O. N. 1.)

1442. Unknown old breech-loading smooth-bore flint-lock musket, cal. .69″.
(O. N. 86.)

1443. Hall's U. S. Harper's Ferry breech-loading smooth-bore flint-lock musket, model 1824, cal. .54″.
(O. N. 87.)

1444. Hall's U. S. Harper's Ferry breech-loading smooth-bore flint-lock musket and ramrod bayonet, model 1834, cal. .54″.
(O. N. 88.)

1445. Hall's U. S. Harper's Ferry breech-loading smooth-bore percussion musket and ramrod bayonet, model 1837, cal. .54″.
(O. N. 89.)

1446. Unknown breech-loading smooth-bore musket, cal. .65″.
(O. N. 90.)

1447. U. S. Springfield rifled breech-loading musket and bayonet, Allin's alteration, model 1862, cal. .50″.

(O. N. 91.) Altered on Allin's plan. Leaf spring ejector stud. Five thousand of these guns were made in 1865, as soon as the return of peace permitted the attention of the Ordnance Department to be directed from the question of the immediate supply of the most easily manufactured arms. The arm is the first of the series of alterations of the muzzle-loading rifle musket which have developed into the Springfield rifle, calibre .45″, of the present day. It is opened by raising the cam-latch by means of the thumb-piece, as at present, fired by a side lock in the same way. It differs from the present gun mainly in the detail of its parts, and in the extractor. This slides back and forth in a groove cut in the side of the barrel. Upon its upper edge it bears a rack, into which meshes a series of similar teeth in a curved arm running up from the front of the breech-block. A spring serves to draw it back. The objection to this arrangement was its delicacy, and the liability of the stock to being blown away through the cut made for the extractor, in case the cartridge-head should burst.

1448. U. S. Springfield rifled breech-loading musket and bayonet, model 1865, cal. .58″.

(O. N. 92.)

1449. U. S. Springfield rifled breech-loading musket and bayonet, model 1866, cal. .50″.

(O. N. 93.) Differs from Allin's alteration in the greater strength of its parts, and in the extractor, which consists of a U-shaped spring against the side of the receiver. One point of this spring projects into the receiver, and catches against the rim of the cartridge as the cartridge is passed into the chamber. Closing the breech-block compresses this spring, which is released on opening with sufficient force to throw out the empty shell. The caliber of this barrel is reduced from .58″ to .50″ by the insertion and brazing of a lining tube.

1450. U. S. Springfield rifled Cadet breech-loading musket and bayonet, model 1866, cal. .50″.

(O. N. 107.)

1451. U. S. Springfield rifled breech-loading musket and bayonet, model 1869, cal. .50″.
(O. N. 105.)

1452. U. S. Springfield rifled breech-loading musket, Cadet, model, 1870, cal. .50″.
(O. N. 108.)

1453. Springfield rifle, model 1873, cal. .45″, with Metcalfe's detachable quick loader.

This is a perforated block, which can be attached to the catches on the right side of the stock near the receiver. The block serves for packing the cartridges at the Armory for transportation. It holds eight cartridges. It is intended to be thrown away when emptied.

1454. Springfield rifle and bayonet with Buffington sight, model 1884, cal. .45″.

This sight has a long hinged skeleton leaf, held in an upright position by a spring below, and having a slide-plate perforated with sighting holes, but the slide moves within the leaf instead of enveloping it, and a clamp screw at the top of the leaf holds the slide from jumping up in firing. Beside provision for upper and lower sights, upper and lower peep-sight holes are made in the plate. When the leaf is down, a small sight projecting from the face of the slide serves for short range. The following important additions are made: Compensation for drift. The guides in which the slide moves are inclined to the left, so that the sight holes move to the left slightly in going up, giving an automatic allowance for drift, and leaving only the wind to be considered by the soldier. This is the first application of this principle to sights for small arms, though it is used in some of the Navy sights for heavy guns. Wind gauge. The leaf is hinged to a swinging plate, pivoted to the sight mass or base, and a worm, turned by a milled head at the right side of the base at the front, engages in the front curved edge of the plate to turn it, thereby moving the sight to the right or left to allow for wind.

1455. Springfield rifle and bayonet with Buffington sight, model 1884, cal. .45″.

1456. U. S. breech-loading Springfield rifle with ramrod bayonet, model 1884, cal. .45″.

1457. Springfield rifle, Officers, model 1873, cal. .45″.

Detachable pistol grip, checked stock, peep and globe sight.

1458. Austrian Werndl breech-loading rifle, model 1872, cal. .43″, with sabre bayonet.

(O. N. 102.) Fired by side-lock. The breech-block swings on an axis below the line of the barrel, but parallel thereto. This is turned by means of a thumb-piece. A spiral groove in the shaft serves to work the extractor.

1459. French Chassepot rifled breech-loading musket and sabre bayonet, cal. .43″.

(O. N. 96.) Handle bent down to be out of the way; paper cartridge. Bolt-gun resembling the Prussian needle gun in principle. The gas-check is a rubber washer on the end of the bolt. This is compressed axially by the powder pressure and forced against the side of the chamber, being similar in principle to the DeBange gas-check now used in heavy guns.

1460. Prussian needle rifled breech-loading musket and bayonet, cal. .56″.

(O. N. 97.) Presented by the Prussian Government to the United States in 1868. This gun was adopted by the Prussian Government in 1847. It fires a paper cartridge, front ignition, the needle striking a pellet of fulminate in the base of the paper sabot which surrounds the ball. There is no gas-check except that resulting from the mechanical fit of the bolt. This is the earliest self-primed cartridge adopted for military service, and the gun is the first example of the bolt system now so common in Europe. The bolt is pushed in and turned, like a common door-bolt, to secure it.

1461. Green's bolt gun, paper cartridge, model 1857, cal. .53″.

(O. N. 98.) Hammer underneath barrel. By depressing the spring to the rear of the bolt the handle of the bolt can be lifted and withdrawn. A piston traversing the length of the bolt and

attached to the handle, serves to pass the charge forward into place. The piston being then withdrawn, the bolt is turned and locked in place by two lugs at its forward end engaging with corresponding recesses in the receiver. The cartridges had the bullets in the rear, so that there were always two bullets in the gun when loaded, the rear bullet serving as a gas-check. Green used a wind-gauge slide on the rear sight, and a barrel with an elliptical bore.

1462. Merrill's rifled breech-loading musket, percussion, model 1858, cal. .58″.

(O. N. 99.) Box with extra percussion cap nipple in it in butt. Altered from Harper's Ferry rifle, 1850 (see lock-plate). Leaf rear sight. The Merrill rifle resembled the Jenks heretofore described. It has a spring catch engaging with lug on barrel. No extractor is used as the cartridge is all consumed. Breech plug faced with copper, probably to serve as a gas-check. Fourteen thousand four hundred and ninety-five Merrill carbines were purchased for use of the army during the Civil War.

1463. Henry magazine breech-loading musket, model 1860, cal. .43″.

(O. N. 100.) This system was invented about 1850, but it was slow in coming into use, until developed about 1866 into the form of the Winchester gun. The gun is operated by a lever swinging forward below. This acts on an elbow joint which works the bolt back and forth. An arm connected with the lever causes a carrier block to slide up and down, transferring the cartridges from the level of the magazine to that of the barrel when the bolt is back, and dropping the block when the bolt is forward, and a cartridge pushed into the chamber. The magazine is charged from the front. The tube is in two sections, the muzzle part made to swing round to the side to clear the mouth of the magazine tube; the spring being first pushed up into this part by means of a thumbpiece attached to the follower, and projecting through a slot cut lengthwise in the magazine tube. Cartridges can then be dropped into the tube. A magazine under the barrel gives room for more cartridges than one in the butt stock.

1464. Ballard rifled breech-loading musket, model 1861, cal. .54″.

(O. N. 101.) By depressing a lever, the breech-block is caused first to recede from the barrel, and then to drop downward, revolving about a shifting horizontal axis at its lower and rearmost corner. Hammer and lock concealed in the breech-block. Rim-fire cartridge. The cartridge shell is extracted by means of a sliding extractor beneath the barrel, moved independently by hand, by means of a finger-piece projecting beneath the tip stock. Depressing the stock leaves the hammer at half-cock. Block cannot be depressed when hammer is cocked. Fifteen hundred of these guns were purchased for use in the army during the Civil War.

1465. Ward-Burton rifled breech-loading musket and bayonet, model 1870, cal. .50″.

(O. N. 95.) Marked Springfield 1871 on receiver. Bolt gun with side-lock. Instead of being secured, like an ordinary door-bolt, as in the Needle gun and Chassepot, the bolt has a sectional or slotted screw at the rear end, engaging, when turned with corresponding screw sections in the receiver, spring extractor lying on bolt and fastened to it. The bolt revolves independent of extractor. Firing mechanism concealed in bolt. Self-cocking by operation of loading. Ejector, a pin driven out of front face of bolt when well back. Issued for experimental trial in the field with the Springfield, Remington and Sharps arms. One thousand of each.

1466. Joslyn rifled breech-loading musket and bayonet, model 1864, cal. .50″.

(O. N. 103.) Opens by turning block to the left. Extractor on block.

1467. Joslyn rifled breech-loading musket and bayonet, model 1864, cal. .50″.

(O. N. 104.)

1468. Colt's revolving sporting rifle, cal. .38″.

(O. N. 106.)

1469. Colt's rifled revolving musket, cal. .44″.

(O. N. 115.)

1470. Colt's rifled revolving sporting musket, cal. .40″.
(O. N. 116.)

1471. Colt's rifled revolving musket and bayonet, model 1857, cal. .56″.
(O. N. 94.)

1472. Russian Berdan rifled breech-loading musket and bayonet, cal. .42″.
(O. N. 109.) Swing block, and sliding striker.

1473. Peabody rifled breech-loading musket, cal. .44″.
(O. N. 110.) Lever, forming trigger, is pivoted to front end of receiver. By lowering lever to the front, the breech-block revolves down around an axis perpendicular to the axis of the bore, and at the rear upper corner of the block; exposing the bore for loading. Ejector in bottom of receiver and operated by fall of block. Hammer on right side, and firing-pin in block.

1474. Martini Henry rifled breech-loading musket and sword bayonet, cal. .45″.
(O. N. 111.) Breech mechanism is like Peabody except as to firing mechanism which is concealed in block. Bayonet has double toothed saw on back of blade.

1475. Remington rifled breech-loading musket, model 1870, cal. .50″. U. S. N.
(O. N. 112.) Marked Springfield 1870; on receiver U. S. N.

1476. Remington rifled breech-loading musket and bayonet, model 1871, cal. .50″.
(O. N. 113.) Marked U. S. Springfield 1872 on receiver.

1477. Spencer rifled breech-loading repeating musket, model 1860, cal. .54″.
(O. N. 114.)

1478. Hotchkiss breech-loading magazine rifle and bayonet, model 1878, cal. .45″.
See Report of Chief of Ordnance for 1882. This gun was introduced about 1879. It is a bolt gun similar to the Mauser. The slot in the receiver is curved at its junction with the front and rear

shoulders. The bolt is hence gently checked just before it is pushed home, preventing shock on the head of the cartridge, and making the operation more continuous than with square shoulders. The front curve also cams the bolt backward in beginning to open, and so starts the shell, which can then be readily drawn out. This action, now used in other bolt guns, was claimed by Hotchkiss as his invention. The magazine, in the butt stock like the Spencer, runs under instead of over the breech-piece, and brings the cartridge into the receiver through an inclined opening in the bottom. A spiral spring is used with follower. Centre-fire cartridges are used. To insert them, the bolt has to be opened, and they are pushed in through the chamber, endwise, singly, butt end first. By a lever at one side the bolt can be locked shut for security, and the hammer held from striking. A lever at the other side shuts off the magazine when necessary for use as a single loader. It is a remarkably simple gun, and it avoids having an extra piece to serve as carrier for transfer of cartridges from the magazine. A peculiar feature is a trigger with a hollow or curved stem where it passes round the magazine. Stops, connected with the trigger, check and release cartridges in the magazine at the proper time.

1479. Hotchkiss breech-loading rifle and bayonet, model 1883, cal. .45″.

1480. Chaffee-Reece breech-loading magazine rifle, cal. .45″. Springfield 1884.

See Report of the Chief of Ordnance, 1882. The position of the magazine is nearly the same as in the Hotchkiss, but in place of having a spring in the magazine, the cartridges are forced forward by studs on a bar at the side of the magazine tube. This bar is moved back and forth by a projection on the bolt. Another bar, which does not move lengthwise, has corresponding studs, and it is kept pressed in by a spring, the studs on this bar keeping cartridges from slipping back when the first bar moves back. The reciprocating bar thus draws the cartridges forward, by regular successive steps, distances equal to their own length. The front cartridge, before the breech is opened, lies in a hollow under the bolt, far enough forward to be pushed up and into the chamber as the bolt is pushed in after opening. A hinged gate in the butt-

plate can be thrown open to admit cartridges in filling the magazine tube. This gate in opening acts upon the studded rods to force them out from the tube, and allowing cartridges to be dropped clear in without striking the studs.

1481. French Gras rifle and sword bayonet, model 1874, cal. .43″.

This is the development of the Chassepot as adapted to the metallic cartridge. The rubber washer, formerly used as gas-check, is therefore omitted as unnecessary, and a heavy extractor placed on the bolt.

1482. Swiss Vetterlin magazine rifle, cal. .41″.

This is a simple bolt gun, the bolt operating a sliding carrier block like that of the Winchester, from which magazine system it is derived. The same remarks as to filling the magazine and loading apply to this as to the Winchester. The bolt differs from the Mauser bolt in having the handle near the rear and bent down by the side of the stock, two lugs on the turning part of the bolt, near the rear, catching the shoulders in the breech frame. This rear position of the handle is an advantage in magazine guns. The firing spring is spiral, as in the Mauser, but made large and heavy, though short, and placed in the rear instead of the front part of the bolt. This makes an enlargement in rear and gives a clumsy look.

1483. German Mauser magazine rifle, cal. .43″.

1484. Hotchkiss breech-loading rifle and bayonet, model 1883, cal. .45″.

1485. Spencer repeating shot gun.

The breech-block in this gun resembles the Peabody, it being hinged in rear, and made to move up and down in front. Its special peculiarity lies in the arrangement for operating the block by means of a sliding handle on the magazine tube under the barrel. This handle is connected with flat bars, which extend to the rear, into the receiver and along the breech-block. A stud on the inner side of one rod fits in an inclined groove in the side of the breech-block, so that sliding the handle back wedges down th block to open the breech. Immediately after this, an extractor

is operated by the bar on the other side to remove the empty shell. When the handle is well back, the block is thrown up by a spring, tossing the shell out above. While the barrel is pushed in by moving forward the slide, and the breech is closed. The magazine is filled from underneath the breech-block.

1486. Winchester repeating shot gun.

1487. U. S. muzzle-loading smooth-bore flint-lock wall piece.

(O. N. 130.)

1488. U. S. muzzle-loading smooth-bore flint-lock wall piece.

(O. N. 129.)

1489. English rifled muzzle-loading wall piece, percussion, cal. .90″.

(O. N. 137.) This piece was presented to General A. Mc D. McCook, by General Jose Maria Cunaviejuela, formerly of the Mexican Army, now presented to the Military Academy, West Point, N. Y. It is of English manufacture, made to defend mines, by being placed in position at their mouths. Fort Brown, Texas, July 23rd, 1872. Sgd. A. Mc D. McCook, Brevet Major General, U. S. A.

1490. U. S. muzzle-loading smooth-bore flint-lock wall piece. Brass.

(O. N. 133.)

1491. 60 U. S. rifled muskets with bayonets, model 1842, cal. .69″.

Around the two pillars.

1492. 16 Springfield rifled muskets, cal. .58″.

Around the walls.

1493. 20 Sharp's carbines, cal. .50″.

Around the walls.

MAGAZINE RIFLES.

Magazine arms may be divided into three classes according to the form and position of the magazine.

First.—Tubular magazines in the butt. See Hotchkiss rifle, this sub-section. System no longer used for military arms.

Second.—Tubular magazines under the stock. See the Jarmann rifle, this sub-section. Adopted in France (Lebel), Japan (Murata), and Portugal (Kropatschek). Numerous objections to this system later led to the adoption of the following system :—

Third.—Box magazine, near receiver, either fixed, as in the case of the U. S. magazine rifle, a reserve magazine arm; or detachable as the Mannlicher, essentially a repeater.

The later magazine arms are small caliber rifles, giving the advantage of a decreased weight of cartridge, enabling the soldier to carry the larger supply required by a magazine arm, and that of decreased recoil. When the weight of the bullet was decreased by decreasing the diameter, its length remaining practically constant, the chamber pressure per square inch had to be increased to obtain a greater muzzle velocity. This after repeated failures in trying black powder was accomplished by the use of smokeless powder consisting essentially of gun cotton and nitro-glycerine, or gun cotton alone, dissolved in a suitable solvent, and afterwards treated. This increased muzzle velocity, gave the advantage of greater range, penetration, flatter trajectory and greater accuracy. Some automatic recoil magazine guns and pistols, in which a small number of cartridges can be fired consecutively without interruption by a simple pressure of the finger upon the trigger, the recoil performing all the other operations of loading, firing and ejecting the empty cartridge case, have lately been invented.

MODERN SMALL ARMS.

1550. Revolving arm rack No. 1.

For twenty small arms, containing the following guns:

1551. U. S. magazine rifle and bayonet, model 1892, cal. .30″.

This rifle is upon the Krag-Jörgensen system, modified and greatly improved for the U. S. service. The magazine holding five cartridges, is of the fixed type, horizontal, under, and also to the left side of the receiver. The gun has a cut-off, and the magazine can be held in reserve while single loading fire is conducted. The piece weighs 9.36 pounds, empty without bayonet. The knife bayonet 11.7 inches long, weighs 15 5 ounces, and the scabbard 7.5 ounces. A wooden hand-guard partially covers the barrel. The twist is one turn in 10 inches. The bolt is operated by a quarter turn left, and straight draw rear. The magazine is loaded by a charging-pocket of five, or one by one. The sights provide for ranges from 300 to 1,900 yards. The cartridge shell is flanged, the bullet of lead with jacket of cupro-nickeled steel, weighing 220 grains. The charge is 38 grains of smokeless powder, giving the bullet a muzzle volocity of about 2,000 feet per second. The dangerous range for infantry is 565 yards, and for cavalry 639 yards. The penetration in dry, well seasoned oak at three feet is 24.2 inches. Trigger pull, 4½ pounds.

1552. U. S. Navy rifle and bayonet, model 1895, cal. .236″.

This arm is known as the Lee straight pull rifle, as the bolt breech mechanism is operated by a straight pull to the rear. The magazine is a fixed box, vertical under the receiver. It is essentially a repeater since there is no provision for cutting off the supply of ammunition from the magazine and using the arm as a single loader while the magazine contains cartridges. It may be used as a singe loader if the magazine is not charged, but, in general, it will be used as a repeater., five cartridges in a clip being entered in magazine and the gun not being reloaded until this charge is exhausted. In case loose ammunition is furnished, the magazine may be charged with single cartridges, any number from one to five being entered. The gun is furnished with an adjustable sling strap, a knife bayonet and a cleaning cord, the latter carried in a recess in the butt, closed by a sliding cover. The standard navy

ball cartridge has a solid drawn brass case, with no rim, but a canelure in which the nib of the extractor engages. The bullet is of hardened lead with jacket of cupro-nickeled steel, *i. e.*, steel plated with an alloy of copper and nickel. Weight of bullet complete, 135 grains. Charge 33.2 grains of smokeless powder. Maximum chamber pressure 49000 lbs. per square inch. Muzzle velocity about 2460 foot-seconds. The ammunition is furnished for service in steel clips, five cartridges in each, packed four clips in a paper box, 50 boxes in a case.

1553. Russian Mouzin magazine rifle and bayonet, model 1891, cal. .30″.

Weight 9.5 lbs. Bayonet, old type with quadrangular cross-section. The bolt mechanism is operated by a quarter turn to the left and a straight draw to the rear. The magazine is a box, vertical under the receiver, attached to the trigger guard, contains five cartridges loaded from a clip. No cut off. Sighted up to about 2100 yards. Fires a brass flanged cartridge, containing about 34 grains of smokeless powder and a cupro-nickel bullet, weighing 211 grains, with a muzzle velocity of about 2000 feet per second, penetrating at 310 yards 20 fir boards, one inch thick, placed 2 inches apart. A wooden hand-guard covers the barrel between bands.

1554. Lee magazine rifle with bayonet, model 1884, cal. .45″.

This is a bolt gun, with an opening the length of a cartridge in the bottom of the receiver, just back of the barrel, and it has a detachable magazine which is inserted from below. Several of these magazines are carried on a belt. They are each provided with a spring and follower within, to force the cartridges up, and they are filled up in advance by the soldier, as it is intended that they should be saved. They must be strong, and made carefully, as they form, when attached, a working part of the mechanism, and a slight deformation would interfere with their operation. When a magazine on the gun is emptied, it is dropped out by pressing a spring, and a new one already filled is inserted. A magazine holds five cartridges of our service model caliber .45″, but more of a smaller caliber could be carried. The gun can be used as a single loader when the magazine is off, as a spring plate then covers the bottom of the receiver. A recent addition made

for the proposed arm of the English service allows this plate to come into play even when the magazine is on the gun but not forced up into position for feeding. The magazine can be filled when on the gun, if the bolt is drawn out and the gun unloaded. See Report of the Chief of Ordnance for 1882.

1555. English Lee-Metford magazine rifle with bayonet and scabbard, cal. .303″, Mark II, 1893.

Weighs 9.8 lbs. Sword bayonet (1888) knife bayonet. Wooden hand guard. Bolt mechanism operated by a quarter turn to the left, and straight draw to the rear. Detachable vertical box magazine under receiver containing ten cartridges, loaded one by one through the receiver. Cut-off. Sighted up to 2800 yards. Fires a flanged cartridge containing 30 grains of cordite and a cupro-nickel jacketed bullet of 215 grains with a muzzle velocity of about 2000 feet per second, penetrating at 25 yards 41 inches in fir timbers.

1556. U. S. magazine carbine, model 1896, cal. .30″.

The same ammunition is used for the carbine and the rifle. The main differences between the carbine and the improved rifle, are: 1. The barrel is 22 inches long, its dimensions up to that distance from the chamber are the same as those for the rifle barrel; 2. A half stock; 3. Only one band, provided with a rear sight protector; 4. No butt swivel and plate; 5. A sectional cleaning rod in two pieces carried in butt of stock; 6. A band spring same as that on Springfield rifle. All carbines so far made are of this model (1896).

1557. Winchester repeating rifle, model 1895, cal. .30″.

Presented to the Museum of the Department of Ordnance and Gunnery, U. S. Military Academy, by the Winchester Repeating Arms Co., March 3, 1897. This is a fixed box magazine, lever action rifle. The receiver opens at the top, and permits the symmetrical locking of the breech-bolt. The first motion of the lever withdraws the trigger from contact with the sear, before the gun is unlocked, so that it is impossible to fire the gun except when fully locked. The continued opening motion of the lever, draws down the locking bolt and withdraws the breech-bolt, cocking the gun and ejecting the cartridge or fired shell. The breech-bolt,

passing over the hammer, presses the firing pin-lock against the latter and makes fast the firing pin. When the breech-bolt is in the rearmost position, the hammer is made to hold it open by contact, so that the magazine may be easily loaded. When in this position, the upper cartridge in the magazine is so presented as to engage the breech-bolt. The closing action of the lever carries forward the breech-bolt, forcing the cartridge out of the magazine into the chamber. After the breech-bolt has reached the closed position, the locking-bolt is lifted into place, first locking the gun and afterward unlocking the firing-pin. The final closing movement of the lever presents the trigger against the sear, leaving the gun in position for firing. The magazine, of the box type, contains five cartridges, and the number in the magazine can always be known by opening the gun, if light serves, or by feeling, if light fails. The magazine follower presents the cartridge to the lower front edge of the breech-bolt in position to be forced into the chamber, and is arranged to prevent the escape of the cartridge following, before the proceeding one is in the grasp of the extractor, thus preventing jamming of the gun by false movement. The disposition of the magazine and parts is such that the gun can be used as a single loader, keeping the magazine in reserve.

1558. Winchester repeating rifle, model 1873, cal. .44″.

Presented to the Museum, Department of Ordnance and Gunnery, U. S. Military Academy, by the Winchester Repeating Arms Co., March 3, 1897. The Henry system, invented about 1850, was slow coming into use until developed about 1866 into the form of the Winchester gun. The Winchester rifle, model 1873, is operated by a lever swinging forward below. This acts on an elbow joint which works the bolt back and forth. An arm, connected with the lever, causes a carrier block to slide up and down transferring the cartridges from the level of the magazine to that of the barrel when the bolt is back, and dropping the block when the bolt is forward and a cartridge pushed into the chamber. The magazine tube under the barrel, is continuous. An opening at the rear, covered by a spring plate, allows the insertion of cartridges one at a time even when the gun is loaded. No other means of loading is provided than this method through the magazine. This gun attracted much attention abroad when first made about 1866 and it was adopted in Switzerland, where it was afterward displaced

by the Vetterlin, constructed on the same magazine principle. The cartridge for the Winchester rifle (1873) was center fire containing a charge of 40 grains of black powder and a lead bullet weighing 200 grains.

1559. Cadet U. S. magazine rifle with bayonet, model 1896, cal. .30″.

These rifles furnished to the Cadets of the U. S. Military Academy are of the regular .30″ caliber service pattern, model 1896, except the bayonet and ramrod, with minor details controlled thereby. The bayonet is shorter than the service pattern and the ramrod is in one piece (model 1892).

1560. U. S. magazine rifle with bayonet and scabbard, model 1896, cal. .30″.

This is the magazine rifle now being fabricated and embodies the changes due to unsuitable metal or defects in construction observed in the model 1892 rifles issued for service. The cut-off is made to "cut-off" the magazine when the thumb piece is down, the reverse of the first construction. For the long wiping rod, is substituted one in three sections, to be carried in holes in the butt and inserted through a spring-cap on the butt plate. The rear sights of the earlier pattern in service have been entirely replaced by those of the latest model (1896). These sights provide for a continuous adjustment in elevation and will enable the soldier to correct his aim in any case for "high" or low shooting. As regards direction, the sight notches in the leaf and slide are placed in the vertical plane containing the axis of the bore. This position is found to give a close correction for drift for all ranges up to 1000 yards. Under normal conditions in calm weather, no drift is found up to 500 yards and between that and 1000 yards the drift is slight.

1561. Cadet U. S. magazine rifle with bayonet, model 1896, cal. .30″.

See 1559.

1562. Revolving arm rack No. 2.

For twenty small arms, containing the following guns,

1563. Austrian Mannlicher magazine rifle with bayonet and scabbard, model 1888, cal. .433″.

The bolt is operated by a simple forward and back motion of the hand (straight pull), most of the military bolt guns in use requiring the bolt to be turned to secure it after closing, or to unlock it for opening. The bolt handle, with knob at rear, is connected with a piece which slides in and out at the end of the bolt and which has a wedge-shaped projection below. Hinged at the front to the under side of the bolt, in rear of the magazine, is a brace or cam-latch, and the wedge above referred to works in a slot in the rear of this brace, forcing the latter down when the bolt is pushed well forward, and securing it against a shoulder in the frame of the gun. Drawing back the handle raises the brace by an inclined projecting lip on the wedge and allows the bolt to slip back. The magazine is under the receiver and to fill it the bolt has to be drawn back. A special cartridge feed case is used. The case holds the flange ends only of the cartridge and the top one alone can move forward. The whole package case and all, is inserted from above into the magazine, the spring in the magazine acting through the case on the cartridges. The emptied case either falls out at the bottom of the magazine or is forced out by inserting another full case. Cartridges cannot be inserted one at a time into the magazine as the case forms part of the magazine mechanism to control the cartridges, making a sort of cross between a detached and fixed magazine. The rifle is therefore essentially a repeater. At present the Austrian army uses the Mannlicher rifle, model 1890, and carbine, 1890, caliber .315″. The Mannlicher has been adopted in Holland (model 1895, caliber .256″), Roumania (model 1893, same caliber), and Peru (model 1888, caliber .315″), the bolt however being operated by a quarter turn to the left, and straight draw rear for opening or closing, and locking.

1564. Cadet U. S. magazine rifle with bayonet, model 1896, cal. .30″.

See 1559.

1565. Lee magazine rifle with bayonet, model 1884, cal. .45″.

See 1554.

1566. Cadet Springfield rifle with bayonet, model 1884, cal. .45″.

Weight without bayonet 8.49 lbs. Bayonet nearly 2 inches shorter than the service rifle. Trigger pull 6 to 8 lbs. The Cadet rifle is three inches shorter than the service rifle. The number of grooves, twist, depth and width of lands same as in service rifle. The upper band of the Cadet rifle has no gun-sling swivel and also differs in the shape of the lug and size of the stacking swivel. The barrel (length in the bore 29.6 inches, 32.6 inches for service rifle) is reduced at the muzzle to the same diameter as that of the service rifle. Otherwise, the various parts are practically the same.

1567. U. S. magazine rifle with bayonet, model 1892, cal. .30″.

See 1551.

1568. U. S. Navy rifle and bayonet, model 1895, cal. .236″.

See 1552.

1569. Schulhoff magazine rifle, cal. .315″, 1888, Austrian Invention.

The Schulhoff magazine gun. Its construction is novel and interesting. The magazine is a fixed hollow drum under the receiver. An axial shaft nearly parallel to the barrel runs through the drum, and this carries a radial plate which revolves with the shaft and acts as a "follower," pushing before it cartridges placed in the magazine, and delivering them at an opening in the bottom of the receiver, where they can be caught by the bolt in loading. An opening on the right-hand side of the magazine allows cartridges to be inserted, and a hinged lid closes the opening. The shaft is turned by a spiral spring round the front end.

1570. Jarmann magazine rifle, bayonet and scabbard, cal. .398″. 1889.

Presented to the U. S. Military Academy Museum, by Major General Otto Nyquist, Aide-de-Camp to his Majesty, the King of Norway and Sweden, July 14, 1893. The Jarmann magazine rifle, was formerly used in Norway with a tubular magazine under the barrel. To load, the bolt is turned to the left and then drawn to the rear and the cartridge pushed singly through the receiver into the

magazine. In firing a coiled spring with a piston head forces the cartridges one by one upon a spoon carrier pivoted near rear end of the bottom of the receiver. The other cartridges in the magazine are held back by a stop, operated by the fall of the spoon. When the bolt is pushed forward, the spoon is made to rise and the cartridge pushed home. The objection to this system is the danger of premature explosion, as the primer of one cartridge rests against the bullet of the next, the balance of the piece is changed in firing, the state of the magazine supply can not be seen and the carrier will not work properly unless bolt be quickly and fully withdrawn. The tubular magazine stock under barrel is used by France (Lebel model 1886-93), Japan (1887), Portugal (Kropatschek 1886). Norway has adopted the Krag-Jorgensen, model 1893, cal. .256″.

1571. Belgian Mauser magazine rifle with bayonet and scabbard, model 1889, cal. .301″.

Weighs without bayonet about 8.6 pounds. The bayonet is a knife about 10-inches long. The barrel is a single piece with mantlet or jacket tube. The breech-bolt is opened by a quarter turn to the left and straight draw to the rear and closed by the contrary motions. The magazine is a box fixed vertically under the receiver, containing five cartridges. The magazine is charged through the receiver by means of a clip which may then be thrown away. This rifle is essentially a repeater and does not readily admit of single fire. The cartridge case is of brass, grooved. The bullet is a lead core with jacket of maillechort (copper 80 per cent., nickel 20 per cent.), and weighs 218 grains. The charge is 39 grains of Wetteren smokeless powder, giving the bullet a muzzle velocity of about 2000 feet per second. At about 100 yards the penetration is about 31 inches in pine.

1572. Spanish Mauser magazine rifle with bayonet and scabbard, model 1893, cal. .276″.

Weighs 8.8 lbs. without bayonet, which is a knife 10 inches long. The barrel is one piece with wood on hand-guard. The breech mechanism is a cylindrical bolt with vertical lugs, and is opened by a quarter turn to the left and a straight draw to rear. The magazine is a fixed box placed vertically under the receiver, contains five cartridges, and is charged through the receiver from a

clip. No cut-off. Sighted up to nearly 2200 yards. The cartridge case is brass, bottle-necked and grooved. The bullet is a lead case, with a jacket of steel plated with cupro-nickel. The bullet is of cylindro-ogival shape and weighs 224 grains. The powder charge consists of 39 grains of Cologne-Rothweil smokeless leaf powder giving the bullet a muzzle velocity of about 2400 feet per second. Maximum gas pressure 47000 lbs. per square inch. The dangerous range for infantry firing lying down is 680 yards and for cavalry 760 yards. The penetration at 13 yards is 55 inches in pine. Trigger pull is about 8 lbs.

1573. 3 boards showing parts of the U. S. magazine rifle, cal. .30″.

In different stages of manufacture.

PISTOLS AND REVOLVERS.

The first pistol was a wheel-lock arquebuse so small that it could be held and fired from the extended hand. It was invented in 1545, in Pistoria, a city of Tuscany; hence its name. The English cavalry first used pistols in 1554. The earliest horse-pistols were from eighteen inches to two feet long.

Specimens of revolvers with the present principle of rotation are in existence, which were manufactured in the 17th century. In other early forms the cylinder extended the entire length. In both these systems the cylinders had to be turned by hand. The earliest revolvers were matchlocks.

Though Colt's revolvers were the first ones generally used which turned the cylinder automatically, earlier forms show this improvement crudely. The great objection to revolvers is the escape of gas at the joint between the cylinder and barrel, which loss lessens the range, accuracy and penetration. Attempts to remedy this defect have been made in some systems of revolver construction.

1600. U. S. muzzle-loading smooth-bore pistol, cal. .55″. 1838. A. Waters.

1601. Colt's pocket skeleton revolver, rifled, percussion. Patent 1855.

1602. Austrian muzzle-loading smooth-bore percussion pistol, model 1850, cal. .70″. Amberg.
Original stamp 1842, altered from flint-lock.

1603. Colt's Navy percussion rifled revolver, cal. .36″.
Skeletonized to show construction. Engraving on cylinder representing ships, with words "Engaged 16th, May 1843."

1604. Colt's Navy percussion rifled revolver, cal. .36″.
Skeletonized to show construction. Engraving on cylinder representing ships, with words "Engaged 16th, May 1843."

1605. Whitney Navy percussion rifled revolver, cal. .36″.
Six chambers in cylinder. 755 marked inside of loading lever.

1606. Whitney Navy percussion rifled revolver, cal. .36″.
Six chambers in cylinder. 1855 stamped inside of loading lever.

1607. Remington Navy percussion rifled revolver, cal. .36″.
Six chambers in cylinder.

1608. Remington Army percussion rifled revolver, cal. .44″.
Revolver has six chambers. Stamped patented Sept. 14, 1858.

1609. Prussian muzzle-loading smooth-bore percussion pistol, cal. .61″. Suhl.

1610. Beal's Army rifled percussion revolver, model 1858, cal. .44″.
Bears close resemblance to Remington.

1611. Colt's Navy rifled percussion revolver, cal. .36″.
Six chambers in cylinder. This revolver has picture of ships engraved on it, and the words "Engaged 16th, May 1843."

1612. C. S. A. rifled percussion revolver, cal. .36″.
Six chambers in cylinder, and 1195 stamped on various parts.

1613. Navy muzzle-loading smooth-bore percussion pistol, model 1847, cal. .55″.
Marked Deringer, Philadelphia, U. S. N. 1847 on lock-plate.

1614. Prussian needle rifled revolver for paper cartridge, cal. .35″.
Marked F. V. Dreyse Sömmerda, cal. 0.35″, 12 Gran Pulv and 7434 on various parts.

1615. Remington rifled pistol for metallic cartridge, cal. .50″. 1866.
Usual Remington breech-mechanism.

1616. Colt's Army rifled revolver for metallic cartridge, cal. .45″. 1872.

1617. Colt's Army rifled percussion revolver, cal. .44″.

Scene engraved on cylinder, represents men, mounted and with revolvers in hand, fighting Indians. Inscription reads "Model U. S. M. R."

1618. Remington Army rifled percussion revolver, cal. .44″.

1619. Whitney Army rifled percussion revolver, cal. .44″.

1620. Pettengill Army rifled percussion revolver, cal. .44″.

This revolver has a concealed hammer (hammerless) and is self-cocking. The hammer can be snapped as often as desired if a cap should fail to act, without rotating the chambers by not allowing the trigger to return to its full extent. Stamped Pettengill's Patent 1850, and Raymond and Robitaille Patented 1858 on top of revolver.

1621. Smith & Wesson rifled revolver for metallic centre-fire cartridge, cal. .44″.

By raising the barrel latch in the rear of and above the cylinder, the barrel may be turned down about a horizontal axis in front of the lower part of the cylinder. The barrel in turning down carries with it the cylinder, and at the same time a shaft running through the axle of the cylinder is driven to the rear, pushing out the empty shells by a projecting plate on the rear end. When pushed out far enough to remove the shells, this extractor springs forward into place, and gives room for inserting more cartridges.

1622. Smith & Wesson rifled revolver for metallic centre-fire cartridge, cal. .44″.

This is the same as the above with the exception that it cannot be opened when hammer is down.

1623. Savage's Navy rifled percussion revolver, cal. .36″. 1860.

This revolver has one loop trigger for cocking the hammer and rotating the cylinder, besides the ordinary trigger for firing; should the cap fail to act, the hammer can be cocked with the thumb, without rotating the cylinder.

1624. Le Mat double-barrel percussion revolver, rifle and smooth-bore.

French Navy revolver. Col. Le Mat's patent stamped on barrel. Nine chambers in cylinder for upper barrel which is rifled; lower barrel is smooth-bore for buckshot, and passes through, and is an axis for cylinder to revolve on. The extremity of the hammer is made with a joint, so that it can be turned forward to fire the chambers in cylinder, or turned down to fire the central or lower barrel.

1625. U. S. Army muzzle-loading smooth-bore percussion pistol, model 1843, cal. .55″.

U. S., R. Johnson, Midd[n], Conn., 1843 stamped on lock-plate. This was converted from a flint-lock.

1626. Lefaucheux rifled revolver for metallic cartridge, cal. .44″.

This revolver appears to use rim-fire cartridges and not Lefaucheux pin-fire cartridges. Cartridges are inserted by opening a gate on right side of revolver and empty shells are ejected by unlatching a lever which forms the trigger-guard and which is pivoted under rear end of barrel. This lever has teeth at its forward end which fit a rack on an ejector piston on right side of revolver, and push the piston to the rear, as the trigger-guard or lever, is pushed downward.

1627. Lefaucheux Army rifled revolver for metallic cartridge, cal. .44″.

Pin-fire. By opening the gate on the right side, the rear chambers are exposed and an opportunity given to insert the cartridges. The empty cartridge shells are pushed out to the rear by sliding a rod on a frame. The cylinder stop consists of a pin plying back and forth in the face of the breech. It arrests the movement of the cylinder between the chambers. In consequence of M. Lefaucheux's early invention of this pin-fire cartridge, this is one of the earliest breech-loading revolvers using metallic ammunition. E. Lefaucheux, &c., stamped on left side of barrel, 40832 stamped on receiver.

1628. Lefaucheux Army rifled revolver for metallic cartridge, cal. .44″.

Trubia, 1860, stamped on barrel.

1629. Adam's Army rifled percussion revolver, cal. .44″.

This revolver is self-cocking, the hammer being raised by pulling the trigger. Loading lever is underneath the barrel.

1630. Adam's Navy rifled percussion revolver, cal. .36″.

Loading lever is on left side and is stamped Kerr's Patent, April 14, 1857. Receiver is stamped on right side, Patent, June 3, 1856 and on left side Adam's Patent, May 3, 1858. This revolver is self-cocking, the hammer being raised by pulling the trigger.

1631. Perrin's French rifled revolver for metallic cartridge, cal. .40″.

Stamped on various parts No. 952, Paris, Perrin & Cie B^{te}. The cartridges are inserted through the gate in the rear of the cylinder on the right. The tumbler is without any notch, the hammer falling at the moment that the "lift" of the trigger is accomplished. It may be kept off the cartridge by means of a wedge pressed in by a spring so as to block its fall. The wedge is out of the way when the hammer falls in firing. The pistol uses a central fire cartridge, instead of the pin-fire Lefaucheux cartridge for which it was originally made.

1632. Starr's Army rifled percussion revolver, cal. .44″. 1856.

This revolver has the loading lever underneath the barrel; it has two triggers, one in rear of the other; the forward trigger raises the hammer and rotates the cylinder and as soon as the hammer comes to a full cock, the front trigger presses the rear trigger and trips the hammer.

1633. Starr's Navy rifled percussion revolver, cal. .36″.

Same as above.

1634. Colt's Army rifled revolver for metallic cartridge, cal. .44″.

1635. Schofield Smith & Wesson rifled revolver for metallic cartridge, cal. .45″.

1636. 100 Remington Army revolvers, cal. .44″.

Around the two pillars.

HAND ARMS.

Swords and sabres have usually varied in character with the manner of fighting of different nations; for instance, the Gauls and Germans, who defended themselves with shields made of willow or other light wood, made use of long and flexible swords, while the Greeks and Romans, who wore breastplates and helmets of metal, used short and stout swords. The Knights of the middle ages carried long and heavy swords which they wielded with both hands.

The pike was generally employed by both infantry and cavalry. That for infantry was very long, as in the case of the Macedonian lance, which was about 20 feet in length. The light cavalry lance is still much used in European cavalry.

The Roman javelin was a short pike thrown against the enemy. The spontoon or half-pike was carried by French infantry officers as late as the time of Louis XV. A rifle with bayonet fixed forms the modern pike.

The other hand arms comprise the war club, used in the middle ages, and the battle-axe used by the Celts and Gauls, but principally by the Franks, who hurled it with great skill and strength against an enemy.

Sabres, Swords, Pikes, &c.

1700. German cavalry sabre with scabbard.

Marked Amberg on blade near hilt. Blade heavy, long, straight, with basket-hilt.

1701. 2 cutlasses. Old pattern. 1806.

One in panel No. 1, and one in panel No. 5. Blade marked with a rabbit and 1806. One has a piece mortised on the blade.

1702. 2 U. S. foot artillery swords with scabbards, model 1842.

Marked United States, 1836 W. S. on one side, and an Eagle with N. P. Ames, Springfield on the other side. Brass label on scabbards, reads "Foot artillery sword, 1842." These are Roman swords.

1703. English lance.

1704. Pike, American.

Taken from foot of counter-scarp slope of Fort Wagner, by Lieut. P. S. Michie, about midnight September 6, 1863. Lieut. Michie, then in charge of the siege operations against Fort Wagner, believing that the Fort was being evacuated, went with Captain Walker, 1st N. Y. Engineers into the work, pulling up some of these pikes to get into the ditch. This one was sent to the U. S. Military Academy as a token of Lieut. Michie's affection and esteem for his *Alma Mater*.

1705. Lance, American.

1706. English spontoon.

This is covered with red velvet which is held by gold braid and brass-head tacks. This spontoon is short and has a brass tip.

1707. Malay kreese and sheath.

The kreese has a wavy blade, elaborately ornamented, and the handle is of wood with ornamented brass between handle and blade. The sheath is of brass and has a wood receiver.

1708. Lance or pike.

This has one steel point and a semicircular knife at right angles to flat of steel point. Long thin wooden handle.

1709. English spontoon.

The handle of this spontoon is covered with green velvet, and wound with gold braid held by brass-head tacks. It has an iron or steel point.

1710. U. S. intrenching tool with scabbard.

This tool has a steel blade with a wooden handle, and a leather scabbard.

1711. Bowie knife and scabbard.

This is a broad bladed knife, pointed, sharp on both edges, with a wood handle. The scabbard is made of leather, trimmed with tin. Presented to the Military Academy, West Point, N. Y., by General George H. Thomas, Major-General U. S. Volunteers. This knife was worn by the Tennessee Confederates, who were organized at

Murfreesboro, Tennessee. It was found in a house in the town after the enemy vacated the place. It bore unmistakable indications of having been used in the battle of Stone River, the blade being stained with blood.

1712. Sabre bayonet for gun.

1713. U. S. foot officers sword, with scabbard.

Sword blade is stamped: "Made by Ames Mfg. Co., Chicopee, Mass.," on one side, and "Ames Mfg. Co., Chicopee, Mass., U. S. G. G. S. 1861," on the other side. It has a leather scabbard trimmed with gold-plated mountings. The basket-hilt is of fretwork gold-plated.

1714. Spanish sabre and scabbard for heavy cavalry, model 1875, Toledo manufacture.

This is a long straight weapon, sharp on both edges, and it has a basket-hilt. The blade is stamped "F^{ca} de Toledo 1875." The scabbard is of steel and is also stamped Toledo.

1715. 3 Toledo sabre blades for Spanish light cavalry, Toledo manufacture.

"F^{ca} de Toledo, 1875," stamped on blades.

1716. Sabre and scabbard.

Worn by Brigadier General W. R. Terrill, Captain 5th Artillery, when killed at the battle of Perryville, Kentucky, October 8, 1862. This has a curved blade. Blade is marked on one side "Genl. Boyle," and on the other side "To Genl. Terrill." Basket-hilt and steel scabbard.

1717. Prussian cavalry officers sabre and scabbard.

The blade is very slightly curved with a steel fretwork basket-hilt and an all steel scabbard. Marked "iron proof" on dull edge, "U. S." and "W. Clanberg Solingen" on one side, Eagle with "E Pluribus Unum" and "proved" on the other side.

1718. Prussian light cavalry sabre with scabbard, model 1841.

This sabre has a brass basket-hilt and an all steel scabbard.

1719. U. S. light cavalry sabre with scabbard.

Used both for cutting and thrusting.

1720. 2 U. S. heavy cavalry sabres with scabbards. 1847-9.

1721. 2 Spanish foot officers sword blades. Toledo manufacture.

"F^{ca} de Toledo, 1875," marked on blades.

1722. Small Toledo sword.

"Fabrica de Toledo, 1859," on blade. Presented to the Military Academy, West Point, N. Y., by Colonel Delafield, U. S. A. This is a small narrow sword with a black wood handle, and the point can be made to touch the hilt.

1723. Unknown model horse artillery sabre with scabbard.

This sabre has some gold-plated ornamentation on blade, a steel basket-hilt, and an all steel scabbard.

1724. U. S. sword for staff corps, and field and staff of regiments, with scabbard.

This sword blade is finely etched, with "U. S." on one side and "E Pluribus Unum" on the other. It has a fretwork gold-plated basket-hilt, and a browned steel scabbard, with gold-plated mountings.

1725. Spanish light cavalry sabre with scabbard, model 1875.

This sabre has a brass basket-hilt marked "Toledo." The blade is marked "F^{ca} de Toledo, 1875." The scabbard is all steel and marked "Toledo."

1726. U. S. cavalry officers sabre with scabbard. New pattern.

The blade is marked "U. S." and "U. S. Armory, Springfield, Mass." The sabre has a gold-plated hilt and a nickel-plated scabbard with gold-plated mountings.

1727. U. S. light cavalry sabre.

1728. Sabre with scabbard.

Worn by Lieut. C. Hoskins, Adjutant 4th U. S. Infantry, when killed at the battle of Monterey, Mexico, September 21, 1846. The blade is finely etched and marked "N. P. Ames, Cutler, Springfield;" the guard is gold-plated, and the scabbard is all brass, nickel-plated.

1729. Prussian horse artillery sabre with scabbard, model 1841.

Brass label on scabbard reads, "Prussian sabre for Privates of Horse Artillery, 1841."

1730. U. S. foot officers sword, with scabbard.

This sword has a curved blade, finely etched on both sides, and the raised ornamentation is gold-plated. It is marked "E Pluribus Unum" with 17 stars, eagle, &c., on one side, and "Honour and my Country" with one star, moon, sun, &c., on the other side; has a brass hilt. The scabbard is all steel and it has one groove on each side extending the full length of scabbard.

1731. U. S. infantry sabre with scabbard. Old pattern.

Both sides of the blade are etched, and the raised ornamentation is gold-plated; the hilt has one brass guard-band held in the mouth of a lion's head which caps the hilt. The scabbard is all brass.

1732. 2 U. S. horse artillery sabres with scabbards (1847-64).

1733. U. S. staff officers sword and scabbard, model 1862.

Blade is etched on both sides. Scabbard bronzed with gold-plated mountings.

1734. U. S. musicians sword with scabbard. New pattern.

Blade is stamped "N. P. Ames, Cabotville, 1847." Leather scabbard with brass tips.

1735. Prussian musicians sword with scabbard.

Brass label on scabbard reads, "Prussian sword for musicians, 1841."

1736. 2 U. S. non-commissioned officers swords with scabbards.

Blades are stamped "N. P. Ames, Cabotville, 1847." These swords have brass hilts and guards and leather scabbards with brass ends.

1737. U. S. staff and foot officers sword, two scabbards.

One dress, the other service. Marked on blade "U. S. Armory, Springfield, Mass." One scabbard is nickel-plated, the other one is bronzed, and both have gold-plated mountings.

1738. Old Spanish sword.

Presented to the Military Academy, West Point, N. Y., from Sanitary Fair in New York City in 1864, through Mr. William Kemble. Blade is inscribed on one side "No Me Saques Sin Rason," and on the other side "No Me Embaines Sin Honor." The guard on hilt is broken and bent, very likely from a blow.

1739. U. S. non-commissioned staff sword with scabbard.

The blade is etched on both sides and one leaf of the guard can be turned down. The blade is stamped "S. & K." The scabbard is leather, with brass ends.

1740. U. S. foot artillery sword with scabbard. Old pattern.

Brass label on scabbard reads, "Foot artillery sword." The weapon has a curved blade and a band guard, a leather scabbard with brass ends.

1741. U. S. musicians sword with scabbard. Old pattern.

This sword has a brass guard, wood handle, and straight blade; leather scabbard with brass ends.

1742. U. S. cadet sword with scabbard. Old pattern.

Blade is stamped "N. Starr, U. S. P." The ribbon guard is stamped "A. 45." This has a straight blade which is grooved and sharp on one edge, and a wood handle. The scabbard is of steel, or iron, painted black, and has a button.

1743. 2 Toledo sabre blades for Spanish heavy cavalry. Toledo manufacture.

Stamped on blade "F^ca de Toledo, 1875." These are long straight blades, sharp on both edges.

1744. Sword and scabbard.

Used by Major General James B. McPherson. The following inscription is engraved on the scabbard: "This sword, used by Major General James B. McPherson, from his graduation at the U. S. Military Academy, as an officer of the Corps of Engineers, to February, 1863, and worn by him in the battles of Fort Henry, Fort Donelson, Shiloh, Siege of Corinth, Iuka, Corinth, and through the campaign in Northern Mississippi during the winter of 1862-3, was given by him to Capt. S. C. Lyford, Ordnance Department, U. S. A. and he now presents it to the Military Academy as a tribute to one of its most distinguished graduates, who gave his life to his country. Beloved by all for his genial qualities and affectionate disposition, he died honored for his noble deeds, his consummate military genius and his scientific attainments. Living as he lived, falling as he fell, ending his glorious career upon the battlefield, pierced by a hostile bullet; the name of McPherson will be revered as the impersonation of all that is true and manly."

SAINT LOUIS ARSENAL, MO., September 21st, 1864.

Brig. General GEO. W. CULLUM,
Superintendent of the Military Academy,
West Point, N. Y.

GENERAL:

I have the honor to send you a sword, formerly worn by Maj. Genl. Jas. B. McPherson, which I think properly belongs to the Institution of which he was such a distinguished Graduate, and to the service such a bright ornament.

With this sword he won imperishable honors, and now sleeping in a soldier's grave, it should be treasured in memory of him, that forgetting everything save devotion to his country, nobly did his duty as a man, and died beloved and regretted by all. I therefore request that it may be placed in the Archives of the Military Academy as being the most suitable receptacle for the arms of our heroic dead.

I am General with the highest respect,
Your obedient servant,
(Sgd.) S. C. LYFORD,
Capt. of Ordnance, U. S. A.

1745. East Indian Chief's sword.

Taken from a native Chief 7½ feet high, at the siege of Delhi. Presented to the Military Academy, West Point, N. Y., by Sanitary Fair, in New York City in 1864, through Mr. William Kemble.

1746. John Brown pike.

The handle of this pike is hollow, and the blade can be drawn in,

1747. John Brown pike.

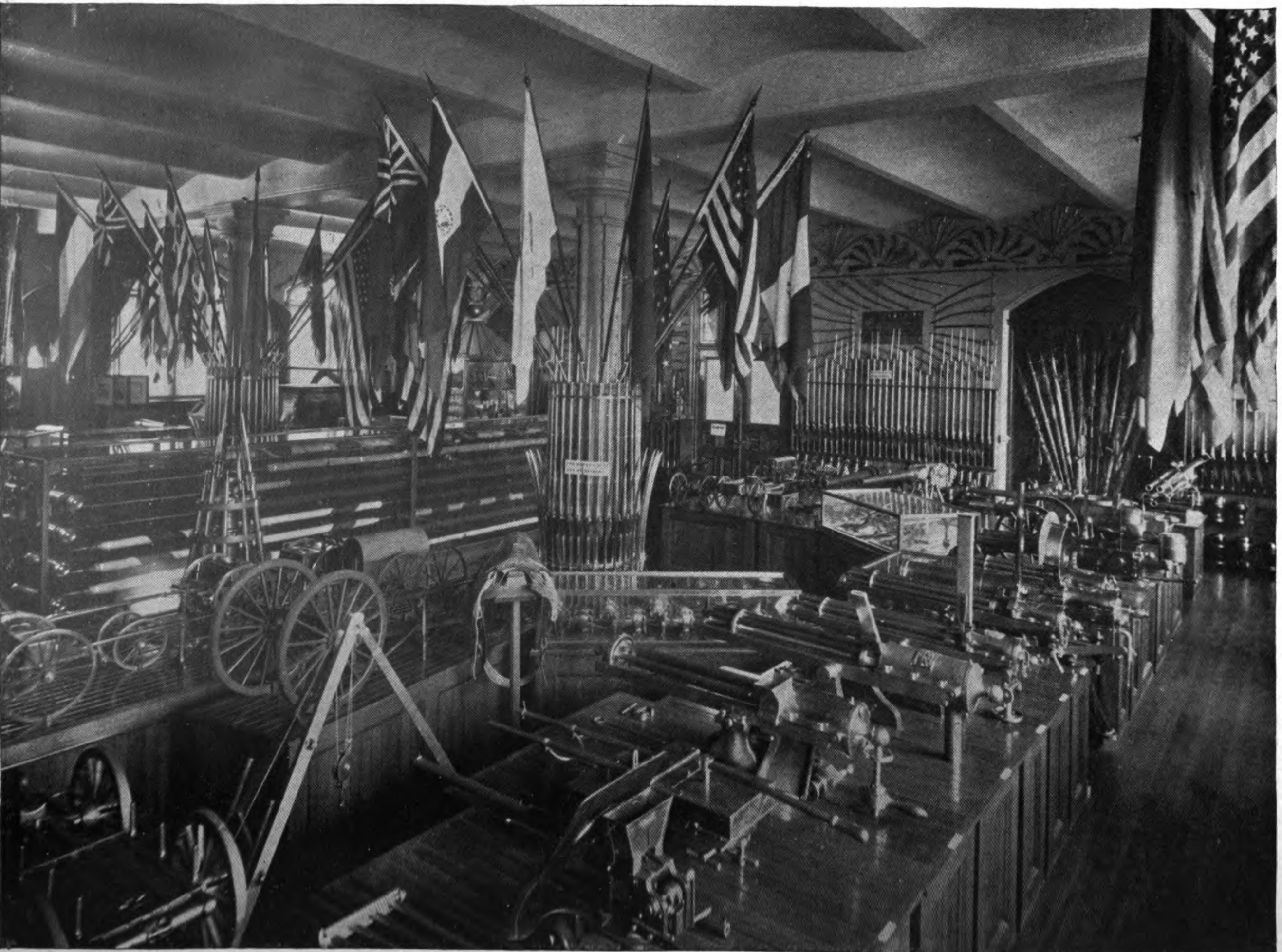
This pike has one straight blade, sharp on both edges, and one crescent blade at right angles to the straight blade, sharp on one edge. "By far the larger portion of John Brown's pikes were shipped off to the south by Floyd, during Buchanan's administration, and during the latter days of the War, when the Confederates were out of arms, money and credit. These pikes, and a quantity of scythes, were used to arm a Texan regiment, from which they were captured and stored at Mount Vernon Arsenal, Alabama, which was partially burned above them. The Government then sent them to the Arsenal, Rock Island, Ill., to be rolled into new iron, but as the rolling mill was not in operation they were sold." —Newspaper Extract.

1748. John Brown pike.

The blade of this pike is shaped like a cross, and has six sharp edges.

1749. 60 light cavalry sabres.

Around the two pillars.



SECTON V—MODELS.

This section contains models of the Rodman gun casting plant; of the modern guns, howitzers and mortars, with their carriages, in the U. S. artillery service; of the service powder magazine; of the Gribeauval field-gun carriage and cannon, the system used during Napoleonic Wars; of Talcott's field-gun carriage (1814); of the Krupp breech mechanism; of the interrupted screw breech mechanism; and of several metal working machines used in gun construction.

MODELS.

1800. Model of Rodman gun casting plant.

The principal difficulty formerly experienced in manufacturing very large cast-iron cannon, was the injurious strain produced by cooling the casting from the exterior. The effect of this cooling was to diminish the strength of the cannon at the surface of the bore, or the surface where the greatest strength is required. As far back as 1844, General Rodman of the Ordnance Department, sought to discover a means to overcome this difficulty. He proposed a plan for internal cooling, which would strengthen the gun at the bore. The internal heat is carried off by pouring a stream of water through a hollow core inserted in the mould cavity, and the flask is surrounded with a mass of burning coals, to prevent too rapid radiation of the heat from the exterior of the casting. After elaborate experiment, his system was adopted by the War Department for all heavy cast-iron cannon. In 1860, the first 15-inch gun was made, and in 1863 the first 20-inch gun, although guns of smaller caliber had been successfully cast and tested previous to 1860. The 20-inch gun weighed 115,200 lbs. and fired a solid shot weighing 1080 lbs. The plant for this purpose is represented by this model.

I. Moulding. The first operation was to form the mould, or a cavity of the form of the gun, by embedding its model or pattern in sand, and then withdrawing it. The wooden pattern, somewhat like that shown at side, and made of several pieces for convenience in withdrawing from flask, was used for this purpose. The mould was formed breech down, in the large flask. This flask is made in sections, corresponding in number and length to those of the pattern. Upon the completion of the mould, the core barrel or arbor, consisting of a water-tight cast-iron tube, made sufficiently thick to withstand the pressure of the metal in the mould, was wrapped with rope for a securing material, in the preparation of the core. The exterior of the core barrel is fluted from top to bottom, to allow the escape of gas generated. Over this rope covering, a coating of moulding composition is applied quite wet, and then dried. The top of the core barrel is fitted with a water-tight cap, as shown in model.

The pit, made of brick, was of the form shown. Grates were arranged around a circumference at the bottom, for fires, lighted immediately after the casting, to retard the radiation of heat from the exterior of the mould. To retain the heat of the fires, the mouth of the pit is covered with a close fitting cover of boiler iron. For furnishing air to the fuel, flues are made, opening into the pit below the grate, while near the top, another flue connecting with a chimney, produces the necessary draught.

To prepare the pit to receive the mould, the bottom is covered with a layer of sand. A heavy cast-iron plate on a truck, is then carefully leveled. Upon this the breech section is placed in an upright position, and the other sections successively placed in position. The core is then lowered into the mould of the gun. The derrick for this purpose is shown; to center and secure it, a frame, called the spider, is used.

II. Casting. The iron for the gun is melted in the reverberatory furnace shown. In this furnace, draught was produced by a tall chimney. The fuel, bituminous coal, was placed in the fuel chamber. The tap hole from the hearth, is connected by a trough with the reservoir, for the purpose of regulating flow of metal into the gun or for mixing the molten metal from different furnaces, in case two or more furnaces should be necessary. From 5 to 12 hours were required to melt the charge. Specimens of metal were tested from time to time.

When the metal is found to be in proper condition for casting, the furnaces are tapped, and the metal conducted by troughs to the mixing basin, where the several charges are thoroughly mixed. It then flows on through other troughs connecting with the side gates of the mould, and passing down, enters the mould cavity by branches. These branches connect with the side gates at regular intervals, and are so constructed that the metal enters in a horizontal direction towards the axis of the mould cavity. The surface of the metal, as it enters, is stirred to prevent the scoria from lodging.

Care is taken not to give it a "swirl," which throws the lightest metal in around the core, where the heaviest and best should be. When the mould is filled, the tap holes of the furnaces are closed and the surface of the metal in the sinking head covered with a layer of charcoal to prevent its chilling. For two or three hours after casting, more metal is added at short intervals of time, by pouring from a ladle at top of mould as the surface sinks.

III. Cooling. The water for cooling is taken from a hydrant connected by rubber hose with a metallic tube which passes through a water-tight joint in the center of the cap of the core, and which extends to within a few inches from the bottom of the core barrel. The water consequently passes into the core cavity at the bottom, and ascends until it reaches the escape pipe, and is discharged.

The flow of water commences as soon as the furnaces are tapped, and is regulated to produce in half an hour after casting, a certain change of temperature, about 25 degrees, between entering and leaving the core. Then the flow is constant until the core is removed. As soon as possible after casting, the fire in the pit is kindled and kept up until the withdrawal of the core barrel. It is then allowed to die out gradually, with mouth of pit closed.

When the change of temperature of the outflowing water has become constant or nearly so, the core barrel is withdrawn. To do this, the flow of water is largely increased for a short time to contract the barrel and loosen it from the casting. The flow is then stopped. The rope with which the barrel is wrapped has taken fire from heat of casting and been consumed, leaving the barrel detached from the composition surrounding and allowing its withdrawal without difficulty.

As soon as the core barrel is withdrawn the water is turned into the bore, being conveyed by the conducting pipe to the bottom and escaping by means of a tube cast into the gun head, entering the bore a few inches from the upper end of the casting. The time occupied in cooling by this process varies from four to six days according to size of casting, and is even greater for 20-inch casting.

Finishing. After cooling, the casting is hoisted from pit or run out with mould, and hoisted therefrom and finished.

The initial tension, or degree of compression of the surface of the bore is tested by rings of metal taken off the gun head parallel to the face of muzzle. By this process of casting and cooling, the interior layer next to the bore of the gun is cooled first. The next layer then cools and contracts upon this and so on successiyely to the external surface. A strain of compression is thus brought upon the bore, which compression must be overcome before a strain of extension can be brought upon the metal of the bore by

the outward action of the powder gases; thus strengthening the gun at the bore, which part is subjected to a greater powder pressure than the exterior layers. This principle is now utilized in "building up" guns composed of concentric cylinders united by shrinkage, and more recently by the method of casting steel guns solid, forging, reheating and cooling from the interior.

1801. Model 8-inch sea-coast gun, mounted on Buffington-Crozier disappearing carriage, 1-10 size.

The modern steel sea-coast cannon thus far adopted for the U. S. service are the 8, 10, and 12-inch B. L. rifles, and the 12-inch B. L. rifled mortar. The guns are intended for direct fire against the armored sides of ships, and the mortars for vertical fire against the decks. In addition to these, some form of heavy rapid fire gun will probably be adopted, for sweeping mine fields, and protecting shore batteries against possible land attack. These guns will be placed on non-recoil mounts, protected by steel shields, or on some form of mount that can be raised for firing and lowered under cover when not in action.

The 8-inch B. L. rifle is composed entirely of steel and consists of a tube, jacket, breech bushing, and a number of hoops, united by shrinkage. The breech mechanism is the interrupted screw pattern, with the De Bange obturator. The mechanism consists of the breech-block, obturator, breech-plate, rotating crank and gear, vent closer, tray, translating roller, translating crank, tray latch, securing latch, and hinge pin, all of which are shown on the model. Weight of gun 14.5 tons; powder charge 125 lbs. Projectile 300 lbs. Initial velocity 1950 foot seconds. Muzzle energy about 8000 foot tons. Penetration in steel at muzzle, 16 inches. At about 2 miles, 10 inches. The model gun is mounted upon a model of the 8-inch front pintle disappearing carriage, designed by Colonel Buffington and Captain Crozier of the Ordnance Department.

The gun rests by its trunnions on the upper ends of two cast steel rotating arms, in bearings bushed with bronze. The arms are pivoted near their middle points upon an axle of forged steel, and are connected beneath the gun by a plate transom. The axle rests in bearings in the top carriage, which is formed by the two hydraulic cylinders in two pieces of cast steel, bolted together. In each cylinder are two throttling bars, which pass through notches

in the piston, and serve to regulate the size of the orifice for the flow of the liquid past the piston by a variable cross-section, thus giving uniform resistance to the recoil. The hydraulic cylinders are connected by a pipe at their forward ends, to equalize the pressure in them during recoil. The piston-rods are fastened by means of nuts to projections on the chassis.

The top carriage rests upon rollers of cast steel, which are placed in recesses of the cheek plates of the chassis. The cheek plates are of cast steel and are connected by transoms. They are bolted at the forward ends to the front roller path, which rests upon a live roller ring. The rear of the chassis rests upon the rear traverse wheels. This arrangement provides for traversing the carriage, and it is operated by a gearing, worked by hand power. The counter-weight is suspended from a shaft joining the lower ends of the rotating arms. This shaft, of forged steel, passes through the lower ends of the arms into two sliding pieces, forming a cross-head. A vertical ratchet is formed on the inner face of each cross-head piece to be caught by a pawl on the cheek plates, to hold up the counter-weight. The pawl is mounted upon a short crank actuated by a long lever at the side of the carriage, which arrangement is used for lowering the piece should the recoil be not quite sufficient.

The action of the carriage is as follows: Upon firing the piece the central pivot of the rotating beam moves horizontally to the rear, carrying the top carriage with it; the lower end moves vertically upwards being constrained by the cross-head guides; the gun moves downward and to the rear in the arc of an ellipse. The energy of recoil is absorbed partly by raising the counter-weight, and partly by the resistance of the hydraulic cylinders. After loading, the pawls are tripped and the greater moment of the counter-weight raises the piece into battery. The piece is hauled down into loading position for loading the first time, or for cleaning by hand, by blocks and falls attached to the upper ends of the rotating arms and to lugs on the cheek plates. In the test for rapidity, ten rounds were fired in 12 minutes 21 seconds.

1802. Model 13-inch mortar and bed.

Elevating screw in frame.

1803. Model of 24-pdr. Coehorn mortar and bed, 1-4 size. Made in 1840. Old pattern.

The Coehorn mortar, so called after its inventor, General Coehorn, is a small bronze mortar designed to throw a 24-pdr. shell to distances not exceeding 1200 yards. Weight 164 lbs. Maximum charge ¼ lb. of powder. Mounted on a wooden block furnished with holders, so that two men can easily carry it from one part of a work to another. In the late War, this piece was much used in the field against troops covered by rifle pits. At Fort Wagner, General Gilmore says that it followed close on the heels of the sappers and did good service against the enemy, who were not sheltered against vertical fire.

1804. Model of 12-pdr. Coehorn mortar and bed, 1-4 size. Made in 1840. Old pattern.

1805. Model of 10-inch mortar and bed. Old pattern.

1806. Model of 10-inch mortar and bed, 1-4 size. Made in 1840.

By J. Rupp, at U. S. Military Academy, West Point, N. Y.

1807. Model of Eprouvette mortar and bed, 1-2 size. Made in 1839.

By J. Rupp, at U. S. Military Academy, West Point, N. Y. A small mortar used to prove the strength of gunpowder by determining the distance the shot is thrown. Other things being equal, the square roots of the ranges were taken to represent the relative strengths of the different powders. Superceded by ballistic instruments and pressure gauges.

1808. Model of small Eprouvette mortar and bed.

With copper shot placed in muzzle.

1809. Model of 12-pdr. light Napoleon gun and carriage.

Captured at Columbus, Georgia, by the Division Commanded by Brevet Major General E. Upton, U. S. Army, and by him presented to the U. S. Military Academy.

1810. Model of boring lathe for guns.

This lathe consists of a strong bed, larger than in an ordinary lathe; the headstock, and cone pulley; the face plate; the back rests, forming intermediate supports for the tube to be bored; the boring bar and its tool; the feed screw, which lies inside the boring bar; and the gears by which the feed screw is driven. The tube attached to the face plate rotates, and tool moves straight forward without rotating. The chips or shavings come out the opposite end of the tube from that at which the tool enters.

1811. Model of breech mechanism of Sutcliffe breech-loading rifle, for experiment.

Disk shaped breech-block, supported by a pin attached to the front end of hollow breech-screw, by the half revolution of which the block is lowered into a mortise in the body of the gun, and the chamber exposed. On closing, the screw sets up firmly against the block and transmits the strain to the walls of the breech.

1812. Model of mould for casting cannon.

Moulding, in general terms, is the process by which a cavity of the form of cast gun is obtained, by embedding a wooden model or pattern in sand, and then withdrawing it. This pattern is confined in an iron box, which is divided into two or more parts, for convenience in withdrawing the pattern. The mould is formed in this cast-iron box or flask, which consists of several pieces, each of which has flanges perforated with holes for screw-bolts and nuts to unite the parts firmly.

1813. Model of mould for casting spherical shell.

The pattern for a spherical projectile is composed of two hollow cast-iron spheres which unite in such a manner as to form a perfect sphere. On the interior of each hemisphere is fastened a handle to enable the operator to draw it from the sand when the half-mould is completed. The flasks which contain the mould, are made of cast-iron, in two equal parts united at their larger bases. The cavity of a hollow projectile is made by a core of sand (see interior of model), which is formed around a stem fastened into the lower half of the mould. The stem is hollow and perforated with small holes to allow the escape of steam and gas generated by the heat of the melted metal. It is made of iron, but that part

of it which comes in contact with the melted metal and forms the fuze hole, is coated with sand. After casting, the core is broken up and knocked out.

1814. Model of reverberatory furnace.

This furnace is named from its arch, which reflects the heat on the metal on its hearth. It is built of fire brick, held together by wrought-iron bars and plates. The hearth is of refractory brick over which is a thick layer of sand. The large grate allows a great volume of the flame from the fuel to be drawn over the bridge and through the furnace. For natural draft the chimney is tall. Artificial draft is often used. The charging doors and the tap hole to draw off molten metal, are shown. It has the advantage that substances may be exposed to great heat without contact with the fuel and the metal kept in a molten state without injury for a considerable time, while samples are being tested.

1815. Model of cementation furnace.

This is a closed furnace for preparing "blistered" steel by exposing alternate layers of bar-iron and charcoal to heat for several days. When taken out, the bars are covered with blisters and are crystalline in appearance. The purpose for which the steel is used determines the degree of carbonization. Case-hardening or the process by which the external surface of wrought-iron is converted into steel to enable it to stand the wear and tear of friction, is the same process.

1816. Model of cupola furnace.

This furnace is used to remelt pig-iron in order to obtain a strong casting. The body is usually made of thick sheet-iron lined with fire brick. The charge of pig-iron, scraps of cast-iron, the fuel and flux, are thrown in the door or at the top. The molten metal, in the hearth, is drawn off at the spout. It runs through channels or is carried in ladles to the moulds.

1817. Model pattern for casting cannon.

The wooden model used in forming the mould in the sand, confined in the iron box or flask, is technically called the pattern. It is generally made of hard wood, or of cast-iron for durability. This pattern is generally composed of several pieces for convenience in withdrawing from the mould in the flask. Its dimensions

are slightly greater than the piece to be cast, in order to allow for shrinkage of the melted metal upon cooling.

1818. Model of 8-inch Rodman gun, with sponge, rammer, ladle and worm.

This piece weighs 8465 lbs., is 123.5 inches in length, with 110 inches length of bore. Fires a shell of 48 lbs. with a bursting charge of 1 lb. or a 68 lbs. shot; weight of powder charge 10 lbs. The ladle is a copper scoop, attached to the end of a staff for the purpose of withdrawing the projectile of a loaded siege or sea-coast muzzle-loading gun. In field and mountain service, the trail of the carriage was raised, permitting the projectile to slip out by its own weight. The worm is a species of double cork-screw, attached to staff, and it was used in muzzle-loading cannon to withdraw the cartridge.

1819. Model of battery-wagon and limber.

Made at Watervliet Arsenal, in 1869. The battery-wagon is employed to transport the tools and material for repairs. The body of the battery-wagon is a large rectangular box, covered with a roof of painted canvas, and to the back part is attached a rack for carrying forage. The bottom of the body is formed of one middle and two side rails, resting on a stock and axle-tree as in the travelling forge of the same pattern. The tools and material for the battery-wagon are carefully packed in the manner prescribed in the Ordnance Manual, in order that no difficulty may be experienced in finding a particular article when wanted. The smaller articles are carried in boxes properly lettered and numbered. Both the forge and battery-wagon can be used for siege service as well as field service.

1820. Model of siege mortar-wagon.

The mortar-wagon is employed to transport siege projectiles, mortars and their beds, and spare guns. It is composed of a limber and a body. The body consists of two middle-rails, united so as to form the stock, and two side-rails. These pieces rest upon the axle-tree, and are strongly connected by cross-pieces of wood and straps of iron. At the rear of the body is placed a windlass which aids in mounting guns and mortars. Stakes are placed around the sides of the body, to sustain the side and end-boards which are used in transporting projectiles.

1821. Model of caisson and limber for gatling gun, cal. .50″.

Like the old wooden caisson, except lighter and no spare-wheel. Ammunition chests arranged with partitions and trays for packing feed-cases. Old pattern limber, chest arranged for packing ammunition, feed-cases in wooden tray.

1822. Model showing process of winding wire on Woodbridge gun.

In 1850, Dr. Woodbridge wrote to the Secretary of War requesting a trial of his system, and in 1861 to the Chief of Ordnance presenting anew his plan. In 1872, the Secretary of War approved recommendation of board that a gun be fabricated on this system under appropriations of Congress for tests of heavy rifled Ordnance. An experimental 10-inch rifled muzzle-loading gun on this system was constructed at Frankford Arsenal in 1875-6. Dr. Woodbridge thus describes his system.

"Square wire is wound upon a steel core somewhat larger than the intended bore of the gun, a sufficient number of wires being wound at once, side by side, to produce the required obliquity of the turns. The successive layers have opposite twist, their number being sufficient to give the desired exterior diameter to the gun. When thus wound, the whole mass is enclosed in a tight case, to protect it from oxidation, and is heated therein to a temperature somewhat above that required for the fusion of the metal to be used for consolidating it. The soldering metal is then run in, filling the interstices of the mass. When properly cooled the gun is then bored and finished from the mass, in much the same way as if it were a common casting."

This model represents the steel tube on the winding lathe with a number of layers of the steel wire wound thereon. Samples of the wire used and method of splicing are also shown. The tension rest, controlling the tension at which the wires are wound is also shown.

1823. Model of the plant for casting Rodman 15-inch guns.

Showing the arrangement of the Ordnance Foundry of the South Boston Iron Company, Boston, Mass. This model shows more in detail the mould, core, and cooling apparatus of the Rodman gun-casting plant described in No. 1800, this section.

1824. Model of casemate with gun mounted. Captain King's pattern.

The result intended to be accomplished by this manner of mounting a casemate-gun can readily be seen by an inspection of the model.

1825. Model of gun-pendulum.

The gun-pendulum was formerly used to determine by experiment, the initial or muzzle velocity of a projectile. The gun is suspended as a pendulum as shown, fired, and the recoil impressed upon it by the discharge measured. The expression for the velocity is deduced from the fact that the quantity of motion communicated to the pendulum is equal to that communicated to the projectile, charge of powder, and the air. These methods have been superceded by the electrical ballistic instruments.

1826. Model of 13-inch brass mortar and bed.

1827. Models of two 8-inch howitzers mounted on depressing platforms. Captain King's pattern.

Consists of two counterbalancing depressing platforms, attached by rope to windlass worked by hand. Platform mounted on wheels run on inclined plane as shown. The 8-inch siege howitzer is a cast-iron, smooth-bore muzzle-loading piece, weighing 2600 lbs., length 5 feet. Weight of shell empty 45 lbs. Charge (common powder) 4 lbs. Range about 2300 yards at 15 degrees elevation. Mounted on wooden carriage.

1828. Model of casemate flank defense howitzer, mounted on carriage, and chassis.

This is a 24-pdr. cast-iron smooth-bore muzzle-loading chambered howitzer, caliber 5.8 inches, weight 1475 lbs., for the flank defense of a casemate. Length 5 feet 9 inches. Charge of powder 2 lbs.; shell empty 16 lbs.; canister 20.5 lbs. The canister is used for sweeping ditch in front of curtain and for this, the piece should be depressed 1 to 2 degrees. In repelling assaults double charge of canister were used. The carriage (top and chassis) wooden, without recoil checks.

1829. Model of 10-inch Rodman smooth-bore gun and casemate-carriage with implements.

Length of piece 136.6 inches. Weight 15000 lbs. Charge, cannon powder, 25 lbs. Shell (unfilled) 102 lbs. Shot 128 lbs. Muzzle velocity 1275 feet per second. Top carriage and chassis of wrought-iron; front pintle. The piece when in battery, in the ordinary casemate embrasure, admits of 7 degrees elevation (range 2255 yards) and 6 degrees depression. Recoil is checked by sliding friction. The carriage is mounted upon wheels, which can be brought into bearing upon the chassis, for maneuvering.

1830. Model of 15-inch Rodman smooth-bore gun and barbette carriage, with implements.

Weight of piece 49000 lbs. Length 190 inches. Shot 450 lbs. with 100 lbs. of mammoth powder. Shell (unfilled) 330 lbs. with 60 lbs., same powder. Bursting charge 12 lbs. of mortar powder. Muzzle velocity 1534 feet per second. Carriage is made of wrought-iron, and consists of the top carriage and chassis, of the front pintle barbette pattern. Recoil checked by sliding friction and slight inclination of chassis. Motion of carriage checked front and rear by pieces of iron bolted to the top of rails, called hurters and counter-hurters. In later patterns, this carriage has been much improved, recoil being checked by hydraulic cylinder.

1831. Model of service powder magazine.

The magazine consists of a brick building with an iron truss roof, ceilings of iron beams with brick arches between, and wooden floor laid on same construction. The arrangements for ventilation, and lightning protection shown. Magazine is provided with tight-fitting doors (metal). Government powder is packed in wooden or iron barrels of 100 lbs. each. The barrels are generally placed in the magazine on their sides, three tiers high, or even four tiers if necessary. Frame-work of wood should be used if the barrels be piled more than four tiers. Small skids should be placed on the floor and between the several tiers of barrels, and chocks should be placed at intervals on the skids to prevent rolling of barrels. The powder should be separated according to kind, and alleys left between tiers. Fuzes, primers, etc., should never be stored in the magazine.

1832. Model of 6-pdr. Gribeauval caisson for field gun, 1-4 size. Made in 1840.

By J. Rupp, at U. S. Military Academy, West Point, N. Y. In 1765, General Gribeauval founded a new system by separating the field from the siege artillery. He diminished the charge of field guns from one-half to one-third the weight of the shot, but as he diminished the windage of projectile at the same time, he was enabled to shorten them and to render them lighter, without sensibly diminishing their range. Field artillery then consisted of 12, 8 and 4-pdr. guns, to which was added a 6-inch howitzer. For draught, the horses were disposed in double file, which was much more favorable to rapid gaits. Iron axle-trees, higher limbers, and travelling trunnion-holes, rendered draught easier. The adoption of cartridges, elevating screw, and tangent-scales, increased the rapidity and regularity of fire. Stronger carriages were made for the lighter guns, and the different parts of all were made with more care. Uniformity was established in all new constructions by compelling all the arsenals to make every part of the carriages, wagons and limbers according to certain fixed dimensions. By this exact correspondence of all the parts of a carriage, spare parts could be carried in the field ready-made, to refit. Thus an equipment was obtained which could be easily repaired and could be moved with a facility hitherto unknown. In order to reduce the number of spare articles necessary for repairs, Gribeauval gave as far as practicable, the same dimensions to those things which were of the same nature. The excellence of this system was tested in the Wars of the French Republic and Empire, in which it played an important part.

1833. Model of 6-pdr. gun with Gribeauval carriage, 1-4 size. Made in 1840.

By J. Rupp, at U. S. Military Academy, West Point, N. Y.

1834. Model of carriage and limber for 3-pdr. field-gun.

Copied from a gun-carriage made by Colonel Talcott, in 1814. Made in 1841, by J. Rupp, at U. S. Military Academy, West Point, N. Y. In this model, the following points are noted. Two limber chests, covered with canvas, detachable, with handles for carrying, and the double trees. This stock trail system followed Gribeauval's

system, the two flasks forming the trail were replaced by a single piece called the stock, which arrangement allowed the new pieces to be turned in a smaller space than that required by the old ones. Later the wheels of limber and carriage were made of same size, weight of limber reduced, and a single ammunition chest put upon it, and the method of connecting the carriage and limber was simplified, and the operations of limbering and unlimbering greatly facilitated.

1835. Model of shot cart.

1836. Model of store truck.

For moving boxes, &c., in storehouses, and embarking and disembarking stores.

1837. Model of hand cart.

Used for the transportation of light stores from one part of a work to another. That for carrying powder, fuzes and such like articles has an arched-lid cover, to keep off rain and prevent accidents from fire.

1838. Model of casemate truck.

This is composed of a stout frame of wood mounted on three barbette traverse wheels, and is employed to move cannon and carriages through posterns and along casemate galleries. The rings are for the purpose of attaching drag ropes.

1839. Model of field and siege gin, 1-4 size. Made in 1839.

By J. Rupp, at U. S. Military Academy, West Point, N. Y. The gin consists of two legs and a pry-pole, a windlass, sheaves, pulleys, and a fall or rope, and is used for mounting or handling guns or other heavy bodies in the field or in the trenches of a siege. The legs are about 14½ feet long; height of gin about 12 feet, and weight about 615 lbs.

1840. Model of casemate gin.

The casemate gin is not so tall as the garrison gin, on account of the lowness of the casemate roofs under which it is used. In all other respects the two are about the same.

1841. Model of 5-inch siege gun, steel, complete with carriage, 1-10 size.

The siege rifle is used for direct fire in the attack and defense of permanent inland works, and the land fronts of sea-coast forts. This gun is constructed on lines similar to those of the 3.2-inch field gun, model 1885. It consists of a tube, jacket, trunnion-band, sleeve, and certain minor parts, assembled by shrinkage, and a breech mechanism like that of the field gun. It is about 12 feet long, and weighs 3660 lbs. The projectile, shell or shrapnel, weighs 45 lbs., powder charge about 13 lbs.; muzzle velocity about 1830 foot-seconds.

The carriage consists essentially of two flasks, parallel throughout, connected by a bottom-plate, and a top-plate and transoms, and the upper and lower axle-plate. The parts of the flask immediately under the trunnion-beds are reinforced by two brace-plates. The lower edges of the flasks and brace-plates are flanged and connected by bolts with the axle-plates. The wheels are of the Archibald pattern, like those used on field guns and carriages. When the gun is mounted upon this carriage, the axis of the trunnion is 72¼ inches above the plane upon which the carriage when unlimbered is supported. This height in connection with the parapet gives ample protection to the cannoneers. The carriage is of steel throughout. The elevating apparatus is a double screw.

The recoil is checked by a hydraulic buffer. The cylinder of this buffer is fixed by side straps to a cast iron pintle-block, and its piston to the underside of the trail. The travelling trunnions are shown on model. This carriage was designed by Major Shaler, Ordnance Department, U. S. Army. The weight of the piece, carriage and limber is such as can be readily transported over pontoon bridges.

1842. Model of 7-inch B. L. rifled siege howitzer, steel, complete, with carriage, 1-10 size.

This is a short light piece of large caliber, intended to give curved fire, to breach masonry works, destroy earthworks and reach troops protected by parapet. Its weight (3710 pounds) is not too great for transportation over ordinary roads and pontoon bridges. It is made heavier than is actually necessary for strength, in order

that the surplus metal may reduce the shock on the carriage. It consists of a tube, jacket, trunnion band, sleeve and certain minor rings, assembled by shrinkage. The breech mechanism is similar to that of the 3.2-inch field-gun. Extreme length 8.5 feet. It fires a large shell weighing 105 lbs., and carrying a bursting charge of about 10 lbs. Powder charge 10 lbs.; muzzle velocity 1085 foot seconds. Made to stand a maximum powder pressure of about 35000 lbs. per square inch, but the actual pressure on firing is about 28000 lbs. per square inch.

The carriage is a built-up construction of rolled-steel plate, mounted upon axle and wheels. The principal feature is the manner of taking up the recoil. The howitzer is mounted upon two trunnion carriages, which move upon inclined slides. The recoil of the piece upon the slides is checked by two hydraulic cylinders of forged steel and the spiral springs. The latter also serve to return the piece to the firing position. They rest against the bronze travelling trunnion beds, and are enclosed in telescoping tubes. The limit of the recoil is about 6 inches. In addition to the recoil cylinders which control the motion of the trunnion carriages, a hydraulic buffer, to further check the recoil, is placed under the carriage, attached to it, and connected to the platform as shown in model.

A bronze elevating rack is attached to the piece, and the elevation given by means of a worm with a shaft and hand wheel. Weight of carriage complete is about 3200 lbs. Carriage designed by Captain Crozier, Ordnance Department. The same limber is used for this carriage as for the 5-inch siege carriage.

1843. Model of limber for siege-gun or howitzer carriage, 1-10 size.

This limber is simply a rolling support for the trail of the carriage in travelling, and has no other office.

1844. Model of 7-inch B. L. rifled siege mortar complete, with carriage, 1-10 size.

The siege mortar is intended to be used in siege operations for the purpose of bringing to bear a vertical fire upon strongly intrenched and covered positions. It is used to supplement the curved fire of the howitzer, by a vertical fire of medium ranges, and to cover the

field at shorter ranges than are accessible to the fire of the howitzer. Extreme range about 2.5 miles.

The mortar is made of steel; the body, including the trunnions, being made of a single forging, properly treated. The breech mechanism is similar to that of the 3.6-inch field mortar, except the form of the vent-closer, and the gas-check which is of the DeBange pattern. Weight 1715 lbs. The weight of shell filled is 125 lbs. Powder charge 5.5 lbs. Muzzle velocity 690 foot seconds. The carriage consists of two cheek-pieces of rolled steel of the general form of a right angled triangle, united by three steel transoms. The mortar is mounted upon two trunnion carriages, which move upon slides inclined to the rear. In front of the trunnion carriages are the hydraulic cylinders that serve to check the recoil, and in rear are the cylindrical cases containing the spiral springs which are compressed when the mortar is fired, assisting in taking up the recoil, and serving to return the mortar to the firing position. Maximum elevation, 60 degrees; minimum, 25 degrees. A set-screw through the trunnion cap-square is used to hold the mortar after the elevation has been given. On one trunnion is the device for elevation or depression, through which the pinch-bar can be thrust to turn the mortar in its trunnion beds. The connections of carriage with platform and arrangements for traversing by means of a pinch-bar, are shown on model.

1845. Model of 13-inch mortar and bed, with implements. Made at Watertown Arsenal, Mass., in 1866. A centre pintle chassis replaces the old wooden platform protected by iron plates formerly used with this mortar, and this saves much time in pointing. By means of the eccentric axle at the center of the chassis, the weight is thrown on the traversing wheels while pointing. Before firing, the chassis is thrown out of gear. Weight 17120 lbs.; weight of shell, 200 lbs.; weight of maximum charge, 20 lbs.; extreme length 54 inches; length of bore 2.7 calibers; range with 45 degrees elevation and maximum charge, 4200 yards; time of flight, 30½ seconds; weight of chassis, 2000 lbs.; length of rail, 190 inches. The mortar can be elevated and depressed, either by a single handspike working in the ratchets cut in the breech, or by two handspikes fitted on the arms attached to the trunnions.

1846. Model of 3.6-inch field gun, with carriage and limber, 1-10 size.

This gun will be principally used for batteries of position. It will follow the movements of large bodies of troops, defend earthworks and important positions on the field of battle, and prepare the way for an advance of the other arms of service by beginning the action at long range. Weight, 1181 lbs.; weight of projectile, 20 lbs.; muzzle velocity, 1550 foot seconds; charge of powder 4 lbs. 3 oz. The carriages used at present are those altered from some originally made for the 3.2-inch guns with heavier axle-plates.

1847. Model of 3.6-inch B. L. rifled mortar, steel, with carriage, platform and implements, 1-10 size.

This is a short, rifled piece, intended for vertical fire chiefly against the personnel of the enemy, to reach troops protected by intrenchments or inequalities of the field, from the direct fire of the field guns. It replaces the Coehorn smooth-bore mortar in service. This mortar is made of a single piece of steel, forged, oil-tempered and annealed, and having trunnions forged solid with the piece. The mortar will withstand a pressure of 22000 lbs. per square inch, but in practice this will be limited to about 18000 lbs. per square inch. The breech mechanism is described hereafter. (See No. 1874 this section, model of 3.6-inch field mortar breech mechanism, one-half size.) Weight of piece, 244. lbs.; length, about 25 inches. The carriage is a solid cast-steel frame. The elevating arc, attached to piece, is clamped at different elevations by clamping device, lever handle shown on right side of carriage. The combined weight of the mortar and carriage is such that they can be carried by means of maneuvering hand-spikes from one part of the field to another. The mortar is fired from a platform of the pattern shown. The platform is fixed in position by stakes. The recoil of the mortar is kept within limits by a rope fastened to anchor-stake. The elevation is given by a gunner's quadrant reading to one minute. The direction is given by rotating around the front pintle in connection with the fixed central sights, front and rear, and correction for deflection or drift is made with the pointing scale. This scale is graduated so that one unit of the scale is equivalent to one-thousand of the range at all ranges. The field of fire embraces all ranges from 400 to 3350

yards, using reduced charges for the shorter ranges. Smokeless powder charges of different weights are used, shell and shrapnel. The shell and shrapnel for 3.6-inch field guns are used, the shell with the Frankford Arsenal base percussion fuze M. model 1894, and the shrapnel with the the F. A. point combination fuze, 28 seconds model 1894. (See fuzes, Section II.) The complete equipment comprises the piece, carriage, platform, stakes, implements and tools, all of which are intended to be transported in the ordinary army wagons.

1848. Model of 10-inch mortar and bed, with platform and implements.

Made at Watertown Arsenal in 1866. This is a smooth-bore cast-iron mortar, without chamber. Weight, 1900 lbs.; length, 28 inches; maximum charge, mortar powder, 4 lbs.; weight of shell, empty, 90 lbs.; bursting charges (musket powder), 2 lbs. The mortar is fired from a wooden platform. The carriage is of wrought-iron, and being without chassis, rests directly upon the platform. Weight of carriage, 1313 lbs. Now replaced by the 7-inch B. L. rifled siege mortar, steel.

1849. Model of 3.2-inch B. L. rifled field-gun, with carriage, limber, horses and harness, 1-10 size.

The field artillery of the U. S. Army, consists of the 3.2-inch field rifle, for use as a horse artillery gun for rapid movements with cavalry, the 3.6-inch field-gun to accompany infantry troops, and the 3.6-inch mortar for vertical fire. The rifles are similarly constructed and consist of an interior tube and jacket assembled by shrinkage. The breech mechanism is of the interrupted screw pattern. (See No. 1875) this section. Total length of 3.2-inch gun about 7.5 feet. Weight 830 lbs. Powder charge 3.5 lbs. Projectiles, shell and shrapnel, weighing 13.5 lbs., and canister. Muzzle velocity 1685 foot seconds. Extreme range about 3.5 miles. The gun is mounted upon a carriage designed by Colonel Buffington, Ordnance Department, made entirely of metal, except portions of the wheels. The principal parts are the axle, axle-plates, wheels, flasks or trail, brakes, and elevating apparatus, all shown on the model. The limber is of metal excepting the ammunition chests, the pole, the footboards and parts of the wheels. The ammunition chest is arranged to carry 42 rounds of ammunition. The friction primers are carried in the cylindrical primer boxes under the chest.

A full set of wheel and lead harness, devised by Brevet Lieut.-Col. E. B. Williston, Major Third Artillery, is shown. It differs materially from artillery harness previously used. The saddle and equipment of cavalry are adopted in place of the old, and the harness is made to conform more closely to the ordinary draught harness used for wagons. It is constructed with a view to celerity and ease in harnessing and unharnessing. The pole yoke is given up, and a neck yoke is adopted. In place of the rigid splinter-bar a swinging double-tree is used, with single-trees attached, to equalize the draught of the two horses. The single-tree is placed above the pole for light draught, and below it for heavy loads.

To unhitch, it is only necessary to unhook the single-trees from the double-trees, and slip the ring of the neck yoke off the end of the pole. The single-trees can then be attached to hooks on the cantle of the saddle. Instead of a single lead-line for the off horse, the bridle has two reins, which unite in a single strap passing over a roller on the saddle, and hanging on the side towards the driver, where he can readily grasp it. Wide and thin traces are used instead of the present thick, narrow trace. The collar is hinged at the top and fastened at the bottom by a spring fastening. Martingale and side straps are used to hold the neck yoke down and relieve strain in holding back. A woven hair pad is recommended. The new harness is much lighter than the old system. It is claimed that this harness is much more convenient in harnessing and unharnessing, and that it can be manufactured more cheaply than that now in use; also, that its adjustment can be more readily learned by civilians called to act as teamsters.

1850. Model of 3.2-inch caisson and limber, 1-10 size. The construction of the caisson is very similar to that of the limber. The side and middle rails are lengthened and the latter terminates in a lunette by which the caisson is coupled to the limber. The limbers for the caisson and carriage are identical. Two ammunition chests are bolted to the iron body of the caisson in the same manner as is the single chest to the body of the limber. The interior of the chests is divided by two wooden partitions into three compartments. Each end compartment is subdivided by brass partition plates so as to hold 21 projectiles by means of suitable wooden packing. Cartridges are carried in the middle apartment. On the rear end of the middle rail is bolted the spare wheel

axle bolster. Upon this axle, secured by a toggle through an eye, is mounted the spare wheel. A spare pole is carried immediately under the middle rail. Two long handled shovels are carried beneath the caisson, midway between the side rails, one on each side. The pickaxes are also carried beneath by fixtures. The axes and spades are carried between the chests. The maneuvering handspike is carried along the right rail, outside. Caissons are furnished with lever road brakes, each side operated separately, but otherwise similar to ordinary wagon brakes. Total weight 4553 lbs.

1851. Model of combined forge and battery-wagon, 1-10 size.

Formerly the battery-forge and battery-wagon were separate carriages. The combination of these was made possible by the changed conditions of construction and transportation, and modified views, based on war experience, of the amount of material and parts to be carried. The advantage of one carriage less in a battery is apparent. The limber is the same, except for the omission of the two primer boxes and the chest has no wood or metal ammunition packing inside; the three compartments being used, the middle one for the portable forge, forge implements and part of the tools and shoe box; the right one for horseshoes; and the left for the remaining tools, and small stores, such as horseshoe-nails, small bolts, nuts, etc., to carry which, two small canvas bags are used. For the coal, a large cylindrical canvas bag, capacity about 3 bushels, is carried on the footboards, lashed to chest handles by stout cords. The dimensions and construction of the iron bodies of the caisson and battery-wagon are the same, but the holes, securing staples and various attachments for securing intrenching tools, shovels, spades, picks and axes, are all different. The battery-wagon body, made of wood, has three compartments. The lids, one on each side, opening into the largest one for necessary battery stores, and a door on the front end into the other two of equal size, each containing a chest that just fills it; one chest containing the saddler's tools, the other the carpenter's and wheelwright's. The anvil is carried as shown. There is a folding forage rack at the rear of the wagon body, and a rail around the top for the lashing on of forage. Road brakes are on each side of body.

1852. Model of garrison gin, 1-4 size.

Made by J. Rupp, at U. S. Military Academy in 1838. This gin is higher, heavier and stronger than the field and siege gin, as it is used for mounting heavier guns, and has not to be transported like the latter with an army in the field. The legs are about 21 feet long. Weight about 1200 lbs.

1853. Model of lever-jack.

This is an adjustable fulcrum with a long lever, used chiefly for lifting when greasing the axles of travelling carriages.

1854. Model of sling-cart. Small.

The hand sling-cart is used in siege and garrison service for transporting artillery short distances. It is a two-wheeled carriage made entirely of iron except the pole, which is of oak. The axle-tree is arched to make it stronger, and connected with the pole by strong wrought-iron straps and braces. In rear of the axle, a projection is welded to receive the end of a strong hook. The end of the pole terminates in a ferrule and an eye. The eye is for the purpose of attaching to the cart when necessary a limber or a horse. Maximum weight carried, 4000 lbs.

1855. Model of sling-cart. Large.

For heavier guns or material, this large sling-cart drawn by horses should be used. The cart is wood throughout.

1856. Model of battery-wagon. Old pattern.

Consists essentially of a box for battery stores and intrenching tools, mounted on two wheels and provided with shafts.

1857. Model of caisson and limber for 12-pdr. field howitzer.

The caisson is used to transport ammunition. The ammunition is contained in three chests, two mounted on the body and one on the limber. Each chest caries 39 rounds, or each caisson 117 rounds. The caisson is composed of one middle and two side rails, one stock and one axle-tree. It carries two ammunition chests, a spare wheel, which fits over an iron axle-arm attached to the rear end of the middle rail, one shod pole, fastened to the underside of the stock and a spare handspike. The spare articles are needed to replace broken parts. The caisson also carries a felling axe, a shovel and pickaxe, to remove obstructions, repair roads, etc., a tarpaulin, strapped on to the limber chest, a tar bucket and a watering bucket.

1858. Model of 12-pdr. mountain howitzer, with carriage, sponge and rammer.

As mountain artillery is designed to operate in a country destitute of carriage roads and inaccessible to field artillery, it must be light enough to be carried on pack animals. This piece is a short, light, 12-pdr. howitzer weighing 220 lbs. The form of the chamber is cylindrical and smaller than the bore, and suited to a charge of ½ lb. of powder. The projectiles are shell and case shot. It is discharged from a small, low, two-wheeled carriage, which serves for transportation whenever the ground will permit. When the piece is packed, the carriage is carried on a separate animal. The mountain howitzer is also employed for prairie service and in defending camps and frontier forts against Indians, in which case it is mounted on a light four-wheel carriage called "the prairie carriage." In the Mexican war, the mountain howitzer was found useful from the facility with which it could be carried up steep ascents, and to the tops of flat roofed houses in street fighting.

1859. Model of 12-pdr. field howitzer with carriage and limber. System 1841.

This was a light piece and carriage, constructed to follow the movements of light troops and cavalry like the 6-pdr. gun. The heavy pieces were the 12-pdr. gun, and 24-pdr. and 32-pdr. howitzers, employed to follow heavy troops. At the commencement of the late war in this country, all these pieces were issued for arming field works, blockhouses, etc., and their places were supplied by the light 12-pdr. gun (smooth-bore) and the 3-inch rifled gun. The 12-pdr. field howitzer, caliber 4.62-inches, weighs 788 lbs. The 12-pdr. field howitzer carriage is of the same form, but slightly lighter and smaller than the 12-pdr. gun carriage. They both consist of two short cheeks of wood, bolted upon a stock and wooden axle-body, in a recess of which fits the iron axle on which the wheels are placed. The stock terminates in a trail and trail-plate, which rests on the ground, and has on the end a strong ring called the lunette, which is placed on the pintle-hook when the piece is limbered. In the stock is placed an elevating screw-box in which the elevating screw is worked.

1860. Model of battery-forge and limber.

The battery-forge is a complete blacksmith's establishment, which accompanies the battery for the purpose of making repairs and shoeing horses. It consists of a body, upon which is constructed the bellows-house, etc.; and the limber which supports the stock, in transportation. The body is composed of two rails and an axle-tree. The bellows-house is divided into the bellows-room (above) and iron-room (below). Attached to the back of the house is the coal-box and in front of it is the fire-place. From the upper and front part of the bellows, an air-pipe proceeds downward to the air-box, which is behind the fire-place. The vise is permanently attached to the stock, and the anvil when in use is supported on a stone or log of wood, and when transported, is carried on the hearth of the fire-place. The remaining tools are carried in the limber-chest. When in working order, the point of the stock is supported by a prop.

1861. Model 24-pdr. siege gun and carriage, 1-4 size. Made in 1850.

By B. W. Norris, Ordnance Detachment, U. S. Military Academy, West Point, N. Y. This carriage is similar to the field carriage of the same date, except it is joined to the limber in a different way. The weight resting on the rear end of the tongue keeps this nearly horizontal, and relieves the horses of the weight of it. The traveling trunnions and bolster for breech are shown.

1862. Model of 42-pdr. seacoast gun, with barbette carriage and chassis.

Old pattern wooden chassis and top carriage.

1863. Model of 24-pdr. flank defense howitzer, with carriage and chassis.

1864. Model of 12-inch B. L. sea-coast mortar, steel, mounted on Gordon spring-return carriage, 1-10 size.

The 12-inch breech-loading rifled mortar, steel, is intended for vertical fire against the decks of warships. It consists of a tube, a jacket and several hoops, assembled by shrinkage. The breech

mechanism differs from that of the other sea-coast cannon by the omission of the breech-plate with resulting changes. It consists of the breech-block, face-plate, rack, translating roller, obturator, tray, hinge block, hinge pin, tray latch, securing latch, vent-cover and associate parts. Weight of mortar 13 tons, extreme length nearly 12 feet, length of bore 10 feet. Weight of charge, 105 lbs. of brown prismatic powder. Two shells, one weighing 800 and the other 1000 lbs. are used. Each is made in two forms: common, of cast-iron, and deck-piercing, of steel. The bursting charge is from 17 to 38 lbs. of emmensite, according to size. Muzzle velocity 1140 feet per second; penetration in steel 9.7 inches at muzzle. Powder pressure 30000 lbs. per square inch. Extreme range about 6 miles. The Gordon mortar-carriage has a circular bed-plate embedded in masonry, on which rests conical rollers kept at proper distance apart by distance rings. On this rests the racer or upper roller path, which supports the carriage proper. The recoil is checked by hydraulic buffers, and the piece returned to the firing position by the action of springs compressed during recoil.

The mortar is mounted in a saddle consisting of arms connected by a heavy web. The saddle is inclined to the rear at an angle of about 45 degrees, the upper ends of the arms forming the trunnion beds, while the lower ends pivot on a shaft passing through a heavy bracket bolted to the top of the racer at its front edge. The saddle is supported at a point about one-third its length from the pivot, by a number of double-coil spiral springs threaded on five rods arranged in a row, side by side. These rods are used to give the necessary initial compression to the springs in setting up the carriage, but afterwards simply serve to sustain the spring column against giving away laterally. The lower ends of the spring columns rest in a spring-box and the upper ends abut against the spring cap. The spring box is hung in two brackets, bolted to the under surface of the racer, by means of trunnions which permit it to adjust itself to the different inclinations of the spring column during recoil. The spring cap performs essentially the same office above as the spring box does below. Both the spring cap and saddle web are perforated to allow the ends of the spring rods to pass through them freely as the piece recoils. The recoil is checked by two hydraulic cylinders with return passage. The cylinders are provided with trunnions, and are hung in brackets bolted to the racer. The lower ends of the cylinders extend some

distance below the racer, and are connected with an equalizing pipe. In the firing position the cylinders are inclined to the front at an angle of about 60 degrees.

At the top of each cylinder are bolted two guides of gun iron, between which moves a sliding head keyed to the end of the piston-rod. The sliding head is attached to the trunnion. The action of the carriage when the piece is fired is as follows: The saddle revolves about its journal to the rear and downward, carrying the mortar and compressing the spring column. As the piece moves down, the studs in the trunnions, force down the sliding heads and piston-rods, until the resistance of the hydraulic cylinder stops the motion, the cylinders rotating about their trunnions to permit the piston-rods to accommodate themselves to the different positions of the curve described by the trunnions of the mortar. The springs then act against the saddle, and reversing the motion, raise the piece to the firing position. The elevating mechanism and the traversing mechanism are shown on model. The shot truck is constructed so as to admit of passing the shell directly from the truck to the mortar without the aid of the lever or similar device. This carriage has been adopted for service.

1865. Model of 12-inch B. L. rifed seacoast gun, mounted on barbette carriage, model 1892, 1-10 size.

This gun is similar in construction to the 10-inch rifle. Weight, 57.5 tons; total length, 40 feet; powder charge, 487 lbs.; projectile, 1000 lbs.; muzzle velocity, 2100 foot-seconds; muzzle energy, 30570 foot-tons; penetration in steel at muzzle, 27 inches, at two miles, about 20 inches. This barbette carriage consists of the top carriage; the chassis and racer; the base-ring; live-roller ring; and devices for checking recoil, elevating and traversing the gun. The parts and arrangements are so similar to the 10-inch carriage as to require no detailed description. The shot-hoist for raising the projectile to the loading position, is the crane and attached blocks and chain on rear of chassis.

1866. Model of 10-inch B. L. rifled, seacoast gun, mounted on barbette carriage, 1-10 size.

This gun is of similar form and construction to the 8-inch rifle. It has two layers of hoops over the jacket instead of one, as in the

8-inch rifle. Weight, 30 tons; total length, about 31 feet; weight of powder charge, 250 lbs.; of projectile, 575 lbs.; muzzle velocity about 2000 foot-seconds; penetration in steel, at muzzle, about 20 inches, at two miles about 15 inches. The carriage is of the centre pintle form, and consists of a cast-iron base-ring, resting upon a masonry foundation, to which it is bolted; a live-roller ring resting upon this; a combined racer and chassis; a top carriage containing the trunnion beds and hydraulic cylinders for checking the recoil; a chain traversing system; the elevating system, a projectile-lifting device; and the loading platform, all shown on the model. It is maneuvered by hand. The recoil is controlled by two hydraulic cylinders, and the return to battery position secured by gravity, the chassis having a slope of 4 degrees. The base-ring has the lower roller path on its upper surface, and a pintle rising from its centre in the form of a right cylinder. The live-roller ring consists of a number of forged conical steel rollers resting at equal intervals on the lower roller path, with end trunnions in inner and outer wrought-iron distance-rings, slotted to receive trunnions. These rings are held concentric by separator bolts. The combined chassis and racer is in one piece, with transoms and strengthening ribs. The lower surface constitutes the upper roller path, and rests upon the live-roller ring system. Four forged clips or guide-hooks are bolted to the lower exterior surface. The lower lips of these guide-hooks engage under a corresponding flange of the lower roller path. These are provided to prevent the chassis from rising. Between them is a dust guard. A circular flange on the interior of the racer constitutes the pintle-ring and extends down over the pintle cylinder of the base-ring.

The top carriage rests upon steel recoil-rollers mounted in recesses in the top of the chassis rail. The chassis-cheeks are united by the rear transoms. The piston-rods pass through lugs which project upward from the front ends of the rails. The front surface of the rail is planed as a seat for a shield, should it be desired to mount one. The top carriage is of steel, cast in one piece. It consists of the trunnion-bed side frames united by a transom passing under the gun. The recoil cylinders are cast in the side frames immediately over the chassis rail. Flanges under the recoil cylinders are clipped over corresponding flanges in the rails. During recoil, the pistons remain stationary and the top

carriage, with its recoil cylinders, is drawn over them, thus subjecting them to no buckling stress.

Uniform resistance in the cylinders to recoil is obtained by the passage of the liquid from the front to the rear through the varying sized ports caused by throttling bars, whose front faces are curved, bolted on on each side of the cylinders. The sectional areas of these bars are such that the orifices for the flow of the liquid vary with the position of the head, so as to ensure the desired resistance in the cylinder. The piston has rectangular slots, one on each side, which fit over the throttling bars. The rear end of each cylinder is closed by a screw-plug cover. The traversing gear is in front, the elevating wheels in rear and at side, and the projectile hoist in rear of carriage.

1867. Model of sea-coast gun, mounted on depressing barbette carriage and chassis.

This carriage was devised about the year 1835 by Brigadier General R. E. De Russy, Corps of Engineers. The top carriage rests in front on the eccentric axle of a pair of large wheels, the rear resting on small wheels running on curved wooden braces. In the firing position the axle is in its highest position, and the small wheels on the highest point of the braces, the gun pointing over the parapet. As the gun recoils the wheels roll backward on cogged rails, carrying the axle to its lowest position, and the truck-wheels move to the bottom of the braces, the recoil being partly by a counterpoise of metallic spokes on the main wheels, opposite the axle, and partly by frictional appliances. The depression of the gun in recoil brings it under the shelter of the parapet from direct fire of the enemy, and protects the gunners in loading. The gun is run into battery by a windlass and chain, the counterpoise assisting. It will be seen that this carriage embodies the principle which Colonel Montcrieff employed later in the construction of his depressing carriages.

1868. Model of 42-pdr. sea-coast gun, with casemate carriage and chassis.

The 7-inch smooth-bore cast-iron 42-pdr. gun, model 1841, weighed 8465 lbs. and was 129 inches long.

1869. Model of 12.25-inch muzzle-loading cast-iron rifle, with barbette carriage and chassis.

The cast-iron body or casing of this gun was cast on the Rodman plan. This body was lined with a coiled wrought-iron tube. Four securing pins prevented the tube from working in the body, a similar construction to the 8-inch rifle converted from the 10-inch smooth-bore Rodman gun. The gun weighed about 90000 lbs. and fired a 700 lb. shot with a charge of 110 lbs. of hexagonal powder. Muzzle velocity 1396 feet per second.

The upper carriage has two sets of wheels, front and rear, placed between the plates composing the cheeks of the carriage. The carriage starts in its recoil on sliding friction, and, after a distance of about one foot, finishes the remainder of its recoil on rolling friction, the rollers moving up wedge-shaped pieces, which form steeper inclines toward the rear of the chassis. The gun is caught at the end of its recoil by couplings, and spring buffers at the rear and front of the chassis relieve the shock if the top carriage strikes. The gun is loaded when drawn back, and when released runs promptly forward "into battery." The ordinary crane and differential pulley are used for loading. The muzzle of the gun is raised and lowered by means of two circular racks, fastened to the breech, and moved by cog-wheels on the carriage. Steps and rails are placed about the carriage, so as to give easy access to all parts. The points of special interest in this carriage are the arrangements for checking recoil. This is accomplished by means of a hydraulic buffer, nine inches in exterior diameter, and long enough to secure a recoil of seven feet. The effect of the force of discharge, communicated to the chassis through the buffer, is borne by the pintle in front, and by two sets of grooved wheels attached to forks supporting the rear end, thus distributing the strain over the entire extent of the foundations. The hydraulic buffer is composed of a strong cylinder, partly filled with glycerine and water, and attached to the front of the chassis between the rails.

A piston-rod projects from the rear, the outer end of the rod being attached to a fork, extending downward from the rear of the top carriage. Perforations in the piston-head allow the flow of liquid as the piston is drawn out during recoil, or pushed in by running the gun forward. The resistance to rapid flow checks the recoil, and allows the use of a shorter chassis than without the

buffer. It transmits the force to the chassis, but in a comparatively gradual manner, without severe shock.

1870. Model of Krupp's breech mechanism for heavy guns. Brass model.

The breech is closed on the sliding block or wedge principle. The slot is cut transversely in the jacket, just in rear of the tube, through which the wedge-shaped breech-block slides horizontally in opening or closing the breech. The block is run in or out by the upper or translating screw, which is held in two collars on the block, and works in a half-nut on the gun. During these motions the breech-block is guided by its recesses working along projections, called guides, in the upper and lower walls of the jacket slots, slightly inclined from the perpendicular to the axis of the gun. The rear of this slot is cut out so that the block is firmly wedged forward on entering. The block is pushed home and locked by a large lower locking screw which works in threads cut in jacket at rear of slot. The obturating plate in front face of block is thus pushed firmly against the Broadwell obturating ring which remains in the seat in the rear end of the tube. The ring is of such a shape that the powder gases push it outwards and backwards, thus effectually preventing the escape of gas between it and the block or the walls of the tube. The vent is axial.

1871. Model of lathe, 1-4 size.

1872. Model of shaping machine, 1-4 size.

1873. Model of 3.6-inch field-gun breech mechanism, 1-2 size.

Like 3.2-inch mechanism (See No. 1875 this section).

1874. Model of 3.6-inch field mortar breech mechanism, 1-2 size.

This breech mechanism is of the slotted screw form and generally similar to that of the field-guns, except that the Freyre gas-check is used and the breech-block has a different handle, locking device and vent-cover. The Freyre gas-check or obturator, placed in front of the breech-block, terminates in a head shaped like a truncated cone, small end towards the rear. A gas-check ring of

highly elastic steel, formed to fit the cone surface on the inside but nearly cylindrical on the outside, surrounds this head, and rests against the breech-block. The head is not in contact with the block, but nearly so, and the distance can be increased or diminished by the nuts screwed on to the rear end of a spindle which passes through the centre of the breech-block. A strong spring intervenes to keep the head away from the block, except when the great pressure of the powder gases presses it home, expanding the elastic ring against the walls of the powder chamber and effectually cutting off all escape of gas. When the pressure is removed, the spring forces the head forward, and the ring is allowed to contract. The expansion of the gas-check can thus be regulated to suit the character of steel in the gas-check ring. The advantage of the Freyre gas-check in this short mortar is that it takes up less space than the mushroom-head and asbestos pad of the De Bange gas-check. The handles are shown in the model. The breech-block is locked in its firing position by means of a locking pin with a swing nut, operated by small handle to which the vent-cover is attached. Only when locked is the vent uncovered.

1875. Model of 3.2-inch field-gun breech mechanism, 1-2 size.

The breech-block is threaded and slotted, three sections being plain and three with threads. The interior of the jacket, in which this works, is threaded and slotted correspondingly. One-sixth of a turn, therefore, serves to lock or unlock the block when in place. The last or rearmost thread on the block is not cut away, and this serves the purpose of closing the rear face of the breech against dirt and wet, and acts as a stop for the block when it is pressed into place. The block is held by a swinging carrier ring hinged at the left side, which allows the block to be swung to the left when drawn out, and guides the block on entering the breech on closing, allowing the block to be freely turned. It serves when closed to fit the space between the jacket and the block. This ring is automatically locked to, and unlocked from, the jacket, by the motion of the block acting on a latch-pin. An automatic vent closer prevents the insertion of a primer for firing before the breech-block is safely screwed home. The lever handle for turning the block, and the bronze handle for withdrawing it, are fastened to its

rear end. The breech mechanism is provided with the De Bange (French) gas-check, which acts as follows.

The breech-block is traversed in the direction of its axis by a spindle terminating in a head, shaped like a mushroom. This head receives the pressure of the powder gases, and it is supported by a plastic ring surrounding the spindle, and interposed between the head and front face of the breech-block. This ring is composed of asbestos and tallow, contained in a canvas envelope, and sustained by two cup-shaped steel rings. The pressure on the head forces it out laterally against the walls of the gun chamber, so preventing the escape of gas.

1876. Model of field artillery wagon.

The function of this artillery store wagon is to carry ammunition for the small-arms of the battery, spare small-arms not in use, spare intrenching tools, water barrel, and the knapsacks of cannoneers. These last are entirely out of place on the limbers and caissons, both on the march and in action. On the march, if so carried, 3000 lbs. would be added to the battery, impairing its mobility. In action, besides the additional weight, they would be an obstruction to the battery's efficiency, and exposed to possible destruction and loss. The knapsack, never going into action, would reasonably insure its benefit to the cannoneer at all times. On the rear of the wagon, a water keg is carried. The name and designation of the battery to which a wagon is issued, is painted on both sides of its canvas cover.

1877. Model of 12-inch B. L. rifled mortar, mounted on spring-return mortar carriage.

The mounting consists of a cast-iron base-ring or lower roller path, secured by foundation bolts to a masonry foundation below the floor level of the emplacement. Upon this base-ring, reposes a circle of conical steel live-rollers, securely held between two concentric frame rings, braced. The axis of the rollers are journaled in these rings. The cast-iron base frame of cellular structure, has a roller path corresponding to that on the base-ring. Upon the base-ring is bolted a pair of cast-iron carriage slides formed to receive the mortar and recoil apparatus. The mortar has a range of elevation between 45 degrees and 75 degrees, and it recoils down slides placed at an angle of 60 degrees with its horizon.

The slides are formed on the inner faces of the spring cases cast in the carriage slides. The slides are in form like the bed of a lathe, and the carriages which carry the trunnions embrace them so as to be supported in every direction. These trunnion carriages are of cast-steel, and are provided with bearings for the trunnions, and with cap squares packed with elastic material introduced for the purpose of softening the shock of recoil. The upper ends of this carriage have formed on them brackets projecting right and left, into the spring cylinders. These rest upon the upper ends of the spiral springs and by that means transfer the weight of the mortar to them.

The slides are slotted to allow these brackets to traverse down the full length of possible recoil, about 2.5 feet. The spring cases are not sufficiently long to accommodate the requisite length of springs, and are therefore produced downwards by means of cast-iron cylinders properly secured. The power to compress the springs is not nearly so great as the energy of recoil and the work done by the falling mortar. Hence a pair of hydraulic cast-steel cylinders are secured to the spring cases immediately below the trunnion carriages. These cylinders are fitted with steel piston-rods which work through hemp-packed stuffiing boxes at either end of the cylinders. The upper end of each piston is keyed to trunnion carriage, and about the middle of the rod a piston is formed. A connecting passage is formed between the two ends of each cylinder. Holes are bored at proper intervals connecting it with the cylinder. The force of the recoil is taken up by the resistance which the fluid offers to being driven through the holes, which are successively closed, and passed by the piston; giving uniform resistance to recoil. Plugs are provided for closing or partly closing these holes and thus regulating the recoil. The elevating device, traversing gear, and loading gear, are as shown.

SECTION VI—MISCELLANEOUS.

This section contains a model of a Mexican silver mine presented to the Military Academy by the officers of the American Army serving in Mexico; an impression of the bore of a 12-inch B. L. rifle after firing 214 rounds; frame containing map of Yorktown, Revolutionary War; photographs of cannon and small arms; English kettle-drum, Revolutionary War; case containing samples of steel; Indian and Fejee Island curiosities; a brick from chimney of house in which General Washington was born; General Scott's letter giving inscription for flag-staffs; part of chain stretched across river at West Point during Revolutionary War (at Trophy Point), &c.

MISCELLANEOUS.

2000. Book containing photographs of small arms.

2001. Book containing photographs of arsenals, etc.

2002. Book containing photographs of guns, carriages, etc.

2003. Book containing photographs of guns and carriages.

2004. Table made from wood taken from "Old number 12 north barracks."

2005. Model of Mexican silver mine of Valenciana, Guanajuato, Mexico.

DESCRIPTION OF MODEL.

The lower portion of the model represents, in front, four horizontal galleries or workings, which are being excavated in the vein of silver ore, which is at this point some 50 feet in thickness; the interior of the galleries is made to resemble, very accurately, the mine itself, being constructed—as well as the front—of the rich silver ore of the mine, mingled with Amethyst, Quartz, Calcareous Spar, &c., which occur associated with it. The figures are all of solid silver, painted, and are moulded to give a faithful representation of each individual miner, even to the countenance. The horizontal galleries on the different levels (of which there are several) extend altogether more than one mile under the ground, and lead into cross galleries which terminate at the foot of each vertical shaft, which is used for ventilation as well as for raising the ore.

Description of Top of Model.—Represents an Enclosed Yard on Top of the Mine.

No. 1. The Admistrador or general director of the mine. No. 2. The Military Governor. No. 3. The director of the smelting furnaces. No. 4. A chemist describing the analysis of a specimen of ore. No. 5. A miner bringing the chemist another piece of ore to analyze. No. 6. A sub-director conversing with an English miner about the quality of a new specimen of ore. Nos. 7, 7, 7, &c. Women engaged in breaking up the ore, rejecting the value-

less portions preparatory to its being reduced to a powder for smelting, &c. No. 8. An overseer. No. 9. The gatekeeper or porter inspecting a miner before allowing him to pass out to prevent stealing. No. 10. An Indian miner selling his share of ore ($\frac{1}{10}$) to a smelter (No. 14). No. 11. Clerk with note-book. (In this model the figures of men and horses are all of solid silver, painted.) No. 12. A carman driving a two-horse cart loaded with bags of ore just raised to the surface.

Gallery No. 1.

No. 20. A Mexican miner showing a rich piece of ore to another miner, No. 21, who is engaged in breaking up the larger pieces. Nos. 22 and 23. Indian miners forcing off pieces of the ore loosened by the blasts. Nos. 24 and 25. Are English and Indian miners breaking into smaller fragments a piece of ore blown off by a blast. The gallery is lighted by candles and torches.

Gallery No. 2.

Nos. 26 and 27. Mexican and German miners breaking up a block of ore. No. 28. An inspector of the galleries. No. 29. Mexican miner forcing off pieces of rock. Nos. 30 and 31. Mexican miners drilling a hole for a blast. The gallery is lighted by candles and torches.

Gallery No. 3.

No. 34. An overseer. No. 35. A German miner forcing off fragments of ore. Nos. 36 and 37. Indian and Mexican miners drilling a blast hole. No. 38. A Mexican miner resting.

Gallery No. 4.

No. 39. A Mexican miner setting fire to the match of a blast, who then retires to avoid the explosion. Nos. 40 and 41. Mexican miners drilling blast holes. Nos. 42 and 43. English and Mexican miners drilling blast holes. No. 44. An English miner resting. No. 45. A Mexican miner breaking off pieces of ore.

MEXICAN EAGLE, FROM THE PRESIDENT'S CANOPY, AT THE NATIONAL PALACE, MEXICO. PRESENTED BY CAPTAIN RAINS.

AZTEC PITCHER.

Supposed to have been used in the temples; the hieroglyphics (on its sides) relate to the consecration of a distinguished person which took place three years after the crowning of the reigning prince. The ceremony is rudely represented on the sides; the front is symbolical of the sun smiling over the auspicious event. Dug from the trenches of Mexico. Presented by Bvt. Capt. Rains.

(*From Old Newspaper.*)

"PRESENT TO WEST POINT ACADEMY.

"A most beautiful and costly present from the officers of the Army in Mexico to the Military Academy, has just been erected in the Geological Hall at that place, which is well worthy of attention, both from its being an object of much curiosity in its details, as well as of special interest in the compliment it pays to the Institution. It represents, or is a model of, the celebrated silver mine of Valenciana, in Guanajuato, with its vertical shafts, horizontal galleries, and numerous figures of miners, horses, &c., in solid silver, engaged in their several occupations. It gives an excellent idea of the manner of working the mines and preparing the ore for smelting; in this respect it will be of much practical value to the Cadets in their course of studies.

"Around the upper part of the model are shelves with mirrors, for holding a rich collection of silver ore, &c., from various mines in Mexico, presented by individual officers. The whole is enclosed in a magnificent glass frame, with brass mountings, constructed in New York by Day & Newell, locksmiths, and is a credit to the mechanical skill of the city. It is arranged with double doors, and columns at the corners resting on a white marble base, and surrounded by spear-heads, and finished off by a pyramidal glass roof capped by a large gilt ball, on which is to be perched a gilt eagle from the palace of Mexico.

"This very meagre description of this valuable donation, gives but a faint idea of its value and appearance, every part of it being interesting, The base on which it rests is to be furnished with corner plates of polished brass, inscribed with the names of the donors, among which are most of the general officers, commencing with General Scott; and representatives from nearly all of the regiments and corps of the army. Other plates are to bear the

names of the killed and wounded graduates of the Mexican War. These plates were appropriately cast in the City of Mexico, from the guns taken in the battles of the valley, as were also the spear-heads resting on the hand grenades (taken at Chapultepec), which ornament the four corners of the base. Altogether it is the most interesting object that the Military Academy affords."

No. 1.

"Received City of Mexico, April 22nd, 1848, of Lieut. Geo. W. Rains, U. S. A., thirty-two dollars for printing, in connection with the subscription, &c., of the model of the mine of Valenciana, presented by the officers of the army and others to the Military Academy.

$32.00. (Sgd.) JNO. H. PEOPLES."

No. 2.

"Received City of Mexico, April 19th, 1848, of Lieut. Geo. W. Rains, U. S. A., six hundred dollars ($600), for the purchase of the model of the Valenciana mine, complete with silver figures of miners, horses, &c., and with the silver ore used in its construction. The said model was made in the State of Guanajuato, Mexico, and was originally designed as a present to the Pope of Rome, and cost $3000 for its construction.

$600. (Sgd.) VICTOR ——."

No. 3.

"Received of Brevet Captain G. W. Rains, three hundred and twenty-six 63-100 dollars for manufacture of a frame for the model of silver mine of Valenciana.

New York, September 2nd, 1848.

$326.63. (Sgd.) DAY & NEWELL."

DESCRIPTION OF MINE.

"At or near Real del Monte are several mines or workings, the principal of which is Dolores. From the surface the main shaft descends nearly fourteen hundred feet, the descent and ascent of which is accomplished by means of a continuous succession of narrow vertical ladders: the visitor clothes himself in a miner's dress, to avoid injury to his own by the mud and water, and with

a helmet-shaped hat, provided with a candle stuck to its top with clay, which scarce serves to make "darkness visible" he commences his visit to the lower regions. Now commences a laborious operation of toiling down step by step, without intermission, until the fatigued body and bewildered mind lose all estimation of distance, and as hollow sounds and reverberations meet the ear, with an increased sensation of heat, vague ideas arise of the impropriety of intruding on Pluto's privacy, whilst dark figures moving about here and there, with fiery torches, complete the illusion.

"The temperature in these mines increases probably about one degree F. for every forty feet, descending, which regular increase, joined to the heat of the lights and of respiration, renders the deep mines uncomfortable, the visitor soon finding himself in a profuse perspiration. The descent of the great shaft of the mine of Dolores is a work of labor, but the ascent is one closely allied to uneasiness, to call it a mild name; for the aeronaut finds himself suspended not between heaven and earth, for then he would have the satisfaction at least, of seeing the distance through which he must fall, should he prove unfortunate; but between its surface and an interminable distance in a dark, gloomy, fathomless abyss, whose black dripping rocks, faintly lighted up by the solitary candle on the sconce of the aerial traveller, seem to be slowly receding to unknown regions below; obscurely impressing on his mind, that he has temporarily, at least, dissolved connection with terra firma, and unphilosophically committed himself to the discretion of the mules above, and to the power of cohesion of the rope to which he finds himself attached.

"If he has ever studied a certain formula, he will find his mathematics employed might and main, in finding, if the product is sufficiently large to accommodate his gravity, which seems to be greatly increased by his reflections. When the immense extent of country in Mexico, which, is traversed by the numerous veins of ore, is considered, and to what a small, very small extent, comparatively, the excavations to obtain it have been carried, the mind is lost, and the imagination totally fails to depict, the incalculable riches which he fancies is concealed in its bosom."

For the American Star.— City of Mexico.

"The undersigned has been employed for sometime past, in collecting ores and other minerals for the National Military Academy, and although the amount procured is not as large as he could desire, still through the liberality of Col. Withers, Lieut. I. N. Palmer and others, who had the opportunity of making donations, it will be probably worthy of acceptance.

"There is in this city at number 7, Calle Plateros, a magnificent model of the celebrated mine of Valenciana, in the State of Guanajuato, with the different mining operations exhibited, with numerous figures, miners, &c., in pure silver, with a considerable amount of the rich silver ore, from the mine it represents, employed in its construction.

"It was made in Guanajuato and is said to have cost $3000; it is now offered for $600, boxed up and ready for transportation. It is proposed that such officers of the army as may feel disposed, particularly those from West Point, unite to purchase this model as a suitable present, of much practical value to the institution; to be placed in a case containing the collection of ores above referred to, and arranged with brass plates, cast from the metal captured in the battles of the valley, which are to be inscribed with the names of the graduates killed and wounded in battle, as also those who have died in Mexico, as well as the names of the donors who present it to the Academy.

"The undersigned will attend personally to see the model tansported to its destination. and if practicable superintend its erection there; and any amount received over and above the cost of its purchase, &c., will be expended in setting it up in a manner worthy of the institution.

"The amount of subscription, if all who have been at the Academy contribute, will be small to each, independently of those officers of the army not from West Point, who have expressed to the subscriber a warm desire to assist towards its purchase, as expressing their sense of the value of the academy to the army in general. It will be besides, if completed as desired, of much practical value, as a historical record to which our *alma mater* can point with pride, showing that her sons have not been found wanting in the hour of battle, and that her value has been appreciated by the brave spirits, who, shoulder to shoulder with her graduates, have together enwreathed their country's flag with a bright circle of glory.

"A subscription paper will be left at the offices of the Star and North American, at the Aztec Club, and with the Quartermaster of each Regiment. As the undersigned expects to leave for the U. S. before many days, he hopes that those who shall feel disposed to contribute, will do so at the earliest mament.

(Sgd.) GEO. W. RAINS,
Lieut. U. S. A."

2006. Gun-carriage wheel.

Belonging to Captain Duncan's battery through the Mexican War. The wheel was in use from July, 1839, until August, 1849, with Company "A," 2nd U. S. Artillery, including two years campaigning in Mexico. It was present at all the battles which are marked upon its fellies, and received the remarkable wound it bears at

Palo Alto. The wheel was deposited at Washington, D. C., for safe-keeping until March, 1862, when it was presented to the U. S. Military Academy, by Brigadier General William F. Barry, Chief of Artillery, Army of the Potomac.

"OFFICE OF CHIEF OF ARTILLERY, ARMY OF THE POTOMAC,
WASHINGTON, March 6th, 1862.

Col. A. H. BOWMAN,
Superintendent U. S. Military Academy.

COLONEL:

For many years past there has been in the safe-keeping of Light Company "A," 2d Regiment U. S. Artillery, a gun-carriage wheel which belonged to the Battery so gallantly served by that Company throughout the Mexican War. This wheel was in use from July, 1839, until August, 1849, including two years of active campaigning in Mexico. It was present at all the battles which are named upon its fellies; and received the remarkable wound it bears at "Palo Alto." It is therefore a curiosity, as well for its long services, as for its admirable mechanical construction. Its history and associations have given it a high value in the estimation of the soldiers of the Battery it so long and so faithfully served, and in the heart of many officers now and formerly belonging to the 2d Artillery; whose official connection with the Battery, and whose social relations with its gallant commander (Col. Duncan) are dearly cherished.

The unsettled condition of the country, and the approaching field service of the Battery, render it now necessary to seek a safe place of deposit for this trophy. None is deemed so appropriate as the U. S. Military Academy.

I therefore respectfully request that you will permit it to be deposited for the present, in the Artillery Museum of the Academy.

I am, Colonel, very respectfully,
Your obedient servant,
(Sgd.) WILLIAM F. BARRY,
Brig. Gen'l, Chief of Artillery."

2007. Frame containing the following blue-print photographs.

Breech mechanism of Gerdom 3.2-inch R. F. gun, block and carrier ring. Maxim-Nordenfelt 1-pdr. R. F. gun, assembled. Maxim-Nordenfelt 1-pdr. R. F. gun, dismounted. Schneider 4.7-inch R. F. gun, mechanism dismounted.

2008. Frame containing the following blue-print photographs.

Breech mechanism of 3.2-inch Gerdom R. F. gun, dismounted. Breech mechanism of 3.2-inch Gerdom R. F. gun, block, firing-pin and cocking lever. Breech mechanism of 3.2-inch Gerdom R. F. gun, assembled, open. Breech mechanism of 3.2-inch Gerdom R. F. gun, assembled, closed.

2009. Frame containing the following blue-print photographs.

Two Wheeler-Sterling shell fired at 4½ inch deck plate, 3rd and 4th rounds. View of armor piercing projectiles after firing. 11¼-inch armor-plate before firing. 11¼-inch armor-plate after firing 1st shot.

2010. Frame containing the following blue-print photographs.

11¼-inch armor-plate after 2nd shot. 11¼-inch armor-plate after 3rd shot. 11¼-inch armor-plate after 4th shot. 11¼-inch armor-plate after 5th shot.

2011. Frame containing the following blue-print photographs.

11¼-inch armor-plate after 6th shot. 11¼-inch armor-plate after 7th shot. Midvale Holtzer 8-inch armor piercing shell. Midvale Holtzer 10-inch armor piercing shell.

2012. Frame containing the following blue-print photographs.

11¼-inch armor-plate ready to be fired at. 11¼-inch armor-plate after 1st shot. Rosette of 11¼-inch armor-plate showing effect of shot on plate. Rosette of 11¼-inch armor-plate same as before, enlarged.

2013. Frame containing the following blue-print photographs.

Hotchkiss 4.7-inch R. F. gun, after bursting at Sandy Hook; Lieut. Peck, Ord. Dept., was killed by the bursting of this gun, February 19, 1895. Hotchkiss 4.7-inch R. F. gun, burst at Sandy Hook; front view of piece that broke off. Hotchkiss 4.7-inch R. F. gun, after burst at Sandy Hook; rear view of breech end. Hotchkiss 4.7-inch R. F. gun, burst at Sandy Hook, rear view of piece that broke off.

2014. Frame containing the following blue-print photographs.

Hotchkiss 3-inch mountain gun and carriage, showing deformation of carriage. 3.6-inch steel B. L. field mortar and carriage. Raskazoff disappearing carriage for 5-inch steel B. L. siege-gun. 7-inch steel B. L. siege howitzer and carriage.

2015. Frame containing the following blue-print photographs.

Gerdom breech mechanism for B. L. field-guns, open. Gerdom breech mechanism for B. L. field-guns, closed. Seabury breech mechanism for 5-inch B. L. siege-guns. Breech mechanism 7-inch B. L. siege howitzer.

2016. Frame containing the following blue-print photographs.

Sponsel 6-pdr. R. F. gun, breech mechanism, closed. Sponsel 6-pdr. R. F. gun, breech mechanism, open. Side view 10-inch wire wound B. L. rifle. Dust machine used in testing mechanism of R. F. guns.

2017. Frame containing the following blue-print photographs.

Sebert velocimeter for measuring recoil and pressure in guns. 100-ton crane. Mounting 8-inch B. L. rifle on proof carriage with Gantry crane. Field-gun platform for measuring velocities of projectiles.

2018. Frame containing the following blue-print photographs.

Grusonwerk carriage for 12-inch steel B. L. rifle, right side. Grusonwerk carriage for 12-inch steel B. L. rifle, left side. Accumulator for 12-inch Grusonwerk carriage. U. S. service barbette carriage for 12-inch steel B. L. rifle.

2019. Frame containing copy of a letter from General Scott.

2020. Mask.

Made by a Tongas Indian, near Fort Tongas, Alaska Territory. These masks are used at the dances during the winter months. This one gives a fair idea of the features of the Indians on this coast and the manner of painting their faces before, or when about to dance. Presented to the U. S. Military Academy, by Lieut. E. P. Murphy, 2nd U. S. Artillery.

2021. General Cullum's ink stand.

Presented to the U. S. Military Academy Museum, by Colonel Craighill, U. S. Corps of Engineers, August 12, 1893.

2022. Frame containing letter relating to "The Standard of the 5th Cavalry."

2023. Impression of bore of 12-inch B. F. rifle.

After firing 214 rounds. This is an impression of upper section of rifled bore at origin of rifling, after 214 rounds.

2024. Section of palmetto tree.

2025. Frame containing map of Yorktown, Revolutionary War.

2026. Section of Woodbridge steel wire gun.

Fired at Sandy Hook. The Ordnance Department has tested three Woodbridge wire wound guns. In 1881, the 10-inch wire wound brazed gun was fractured, and parted longitudinally at the 93rd round. In 1891-2, the 10-inch wire wound cast-iron gun, after firing 161 rounds was so scored and guttered that it was not deemed a suitable gun to be put in service. In 1893-4, a 10-inch Woodbridge B. L. rifle, steel, consisting principally of an inner steel tube, overlaid for half its length with a cylinder of closely fitting steel staves and then wound with steel wire, tinned, which was afterwards soldered, was tested and found completely unserviceable at the 23rd round by rupture (splitting) of the inner tube in five places.

2027. Stand of frames.

Containing duplicate photographs, of a collection made for the Sultan. Presented to the Museum by Lieut. C. H. Clark, Ordnance Department.

2028. Stand of frames.

Containing duplicate photographs, of a collection made for the Sultan. Presented to the Museum by Lieut. C. H. Clark, Ordnance Department.

2029. Glass case containing pieces cut from muzzle of service guns, showing rifling.

2030. English kettle-drum, Revolutionary War.

2031. Apparatus used in illustrating the flight of a projectile.

This special device shows to the eye, without the need of diagrams, a number of phenomena connected with the motion of a projectile in the air.

2032. Frame containing the following blue-print photographs.

4½-inch deck-plate, before firing. Backing for 4½-inch armor deck-plate, side view. 4½-inch deck-plate, after 1st shot. 4½-inch deck-plate, after 2nd shot.

2033. Frame containing the following blue-print photographs.

4½-inch deck-plate, after 3rd shot. 4½-inch deck-plate, after 4th shot. 4½-inch deck-plate, after 5th shot. Two Wheeler-Sterling shell, fired at 4½-inch deck-plate, 1st and 2nd rounds.

2034. Frame containing the following blue-print photographs.

Wheeler-Sterling 12-inch deck piercing shell. 5-inch shell, fired at 4-inch wrought-iron plate. English Cordite smokeless powder. Maxim smokeless powder, before and after firing.

2035. Frame containing the following blue-print photographs.

Powder granules. Cartridge and powder case, large guns. Service charges. Assembled fragments of an exploded 3.2-inch shell.

2036. Frame containing the following blue-print photographs.

Breech mechanism 3.6-inch field mortar. Breech mechanism 3.2-inch B. L. rifle. Breech mechanism 3.6-inch B. L. rifle. Breech mechanism 5-inch B. L. siege rifle.

2037. Frame containing the following blue-print photographs.

Breech mechanism 5-inch B. L. siege rifle. Breech mechanism 8-inch B. L. rifle. Breech mechanism 12-inch B. L. rifle, steel. Breech mechanism 12-inch B. L. mortar.

2038. Frame containing the following blue-print photographs.

8-inch B. L. rifle on proof carriage. 10-inch B. L. rifle on proof carriage, side view. 10-inch B. L. rifle, steel, on proof carriage, breech mechanism closed. 10-inch B. L. rifle, steel, on proof carriage, breech mechanism open.

2039. Frame containing the following blue-print photographs.

Buffington-Crozier, disappearing carriage for 8-inch steel B. L. rifle, gun in firing position. Buffington-Crozier, disappearing carriage for 8-inch steel B. L. rifle, gun in loading position. Buffington-Crozier, disappearing carriage for 10-inch steel B. L. rifle gun in loading position. Pneumatic disappearing carriage for 10-inch steel B. L. rifle, gun in loading position.

2040. Frame containing the following blue-print photographs.

Parts of breech mechanism of Hotchkiss mountain gun, dismounted. Parts of breech mechanism of Skoda 6-pdr. R. F. gun, dismounted. Parts of breech mechanism of Hotchkiss 6-pdr. R. F. gun, dismounted. Parts of breech mechanism of Seabury 6-pdr. R. F. gun, dismounted.

2041. Frame containing the following blue-print photographs.

Breech mechanism of 6-pdr. Sponsel R. F. gun, dismounted. Breech mechanism of 6 pdr. Maxim-Nordenfelt R. F. gun, dismounted. Breech mechanism of 6-pdr. Driggs-Schroeder R. F. gun, dismounted. Breech mechanism of 3.2-inch Driggs-Schroeder R. F. gun, dismounted.

2042. Frame containing the following blue-print photographs.

Gantry crane lifting 12-inch B. L. rifle and carriage. Side view of 12-inch B. L. rifle on proof carriage. Side view of 12-inch B. L. rifle. 12-inch B. L. rifle on Creusot carriage.

2043. Frame containing the following blue-print photographs.

Gordon disappearing carriage for 10-inch steel B. L. rifle; gun in firing position. Gordon disappearing carriage for 10-inch steel B. L. rifle; gun in loading position. Proof carriage for 10-inch Woodbridge wire gun; carriage broken. 12-inch steel B. L. rifle and locomotive.

2044. Case containing specimens and samples of steel and iron.

Illustrating the manufacture of crucible steel. One sample in the case shows the accumulation of sparks, falling from a saw cutting cold steel. Presented to the U. S. Military Academy by Hussey, Howe & Co., Pittsburg, Pa.

2045. Indian war club.

2046. Model canoe or "Bydarka."

A skin boat used by the Aleutians. Presented to the U. S. Military Academy by Eugene O. Fechet, U. S. Army.

2047. Fejee war club.

Presented to the U. S. Military Academy by Smithsonian Institution, Washington, D. C.

2048. Fejee war club.

Presented to the U. S. Military Academy by Smithsonian Institution, Washington, D. C.

2049. One bow and eleven poisoned arrows.

From New Zealand. Presented to the U. S. Military Academy by Smithsonian Institution, Washington, D. C.

2050. War club.

From Samoa Island. Presented to the U. S. Military Academy by Smithsonian Institution, Washington, D. C.

2051. Model canoe or "Bydarka."

A skin boat used by the Aleutians. Presented to the U. S. Military Academy by Eugene O. Fechet, U. S. Army.

2052. Fejee war club.

Presented to the U. S. Military Academy by Smithsonian Institution, Washington, D. C.

2053. Fejee war club.

Presented to the U. S. Military Academy by Smithsonian Institution, Washington, D. C.

2054. Indian wooden dish.

Of pine wood, found near Fort Robinson, Nebraska.

2055. Stone implement.

"This was found about 9 feet under ground. Trees at least 150 years old were growing on top of it. It was discovered by the merest accident. After the ground was cleared for the post of Fort Tongas, the trees, roots and all, were dug up and burned, and a road was cut through a bank close to the beach. After a heavy rain, the bank on the side of the road caved in, and the implement was found embedded in the ground. The Indians say it was used a long, long time ago. As they say 'a long, long time before my Chief's father's father's father's lived.'

"Frequently in clearing the grounds we have discovered the bones of departed 'Sinashes' (Indians). The Indian name for this implement is 'Kanch,' and means a 'wolf.' The head carved in the stone having been intended to represent a wolf's head. From what I can learn from the Indians it was formerly used to chop a narcotic weed formerly used as we now use tobacco." Presented to the U. S. Military Academy by Lieut. E. P. Murphy, 2nd U. S. Artillery.

2056. Fejee bracelet.

Presented to the U. S. Military Academy by Smithsonian Institution, Washington, D. C.

2057. Indian flint spear head.

2058. Thread and needle case.

Maricopa Indians, San Carlos Agency, Arizona. Presented to the U. S. Military Academy by Lieut. C. D. Parkhurst, 5th Cavalry.

2059. Alaska Indian skin cap.

2060. Drinking cup of horn, Revolutionary War.
Carried and used during the Revolutionary War, by Alexander Flood, of the American Army. Presented to the U. S. Military Academy by Sergeant Sylvester Owens, late U. S. M. A. Detachment of Artillery, December 9, 1887.

2061. Small cord of hair.
Maricopa Indians, Arizona. Said to be made from human hair. Presented to the U. S. Military Academy by Lieut. C. D. Parkhurst, 5th Cavalry.

2062. Bone. Deerskin dressing tool.
Tonto Indians, Arizona. Presented to the U. S. Military Academy by Lieut. C. D. Parkhurst, 5th Cavalry.

2063. Shell necklace.
Sioux Indians, captured at Shin Butte fight in 1876. Presented to the U. S. Military Academy by Lieut. C. D. Parkhurst, 5th Cavalry.

2064. Indian charm.
Intended to represent what is commonly called the Killer whale, made by a "Hydah" Indian from Kaigarni, Alaska Territory. Presented to the U. S. Military Academy by Lieut. E. P. Murphy, 2d U. S. Artillery.

2065. Three wooden sticks.
Used for throwing spears.

2066. Piece of wood from U. S. Frigate Congress.
Destroyed off Fort Montgomery, N. Y. October 7, 1777. This fragment was taken from the hulk at very low tide by Captain Theodore Faurot, December 14, 1868.

2067. Hessian spur, Revolutionary War.

2068. Two copper cannon balls.
Of Mexican manufacture; sent here from Fort Union Arsenal, New Mexico. Note how same have been hammered out.

2069. Board containing buttons and buck shot.

Army of the Republic of Texas. The buttons have each one large star which covers the entire face of the button, representing the "Lone Star State." Presented to the U. S. Military Academy by Mr. E. S. Denton, West Point.

2070. English axe-head, Revolutionary War.

2071. Carved slate.

The slate comes from Queen Charlotte's Island, B. C., and was carved by a "Hydah" Indian living on Queen Charlotte's Island. Presented to the U. S. Military Academy by Lieut. E. P. Murphy, 2d U. S. Artillery.

2072. Slate pipe.

Made by a "Hydah" from Queen Charlotte's Islands, B. C. Presented to the U. S. Military Academy by Lieut. E. P. Murphy, 2d U. S. Artillery.

2073. Two pistols.

Formerly the property of Colonel Sylvanus Thayer, U. S. Army. Presented to the U. S. Military Academy by Lieut. O. B. Rosenbaum, 7th Infantry.

2074. Brick.

From Ford's Theatre Building, Washington, D. C. in which President Lincoln was assassinated. Presented to the U. S. Military Academy by General John M. Wilson, U. S. Corps of Engineers.

2075. Brick.

From the chimney of the house at Wakefield, Va., in which General George Washington was born. Presented to the U. S. Military Academy by General John M. Wilson, U. S. Corps of Engineers.

2076. Specimen of a defense used against cavalry

In the defense of Strasburg, Germany, in 1870-1871. Presented to the U. S. Military Academy by N. Sayre Harris, a graduate of the Academy.

2077. Indian whip.

The handle of this whip is a whistle.

2078. Two Indian fish hooks.

From north-west coast of America. Presented to the U. S. Military Academy by Smithsonian Institution, Washington, D. C.

2079. Two Indian spoons.

"All the Indians on the Alaskan coast make and use this style of spoon. These I send are made from the horn of the mountain goat found on this coast. They frequently make them of wood." Presented to the U. S. Military Academy by Lieut. E. P. Murphy, 2d U. S. Artillery.

2080. Sennet line and hook.

From Navigator Island. Presented to the U. S. Military Academy by Smithsonian Institution, Washington, D. C.

2081. Lot of baby playthings.

Sioux Indians. Presented to the U. S. Military Academy by Lieut. C. D. Parkhurst, 5th Cavalry.

2082. Birch gavel.

The head, which is slightly cracked, is from Belle Isle, and the handle from Libby Prison. Presented to the U. S. Military Academy by Cadet Hugh D. Wise, of the Class of 1894.

2083. Alaska Indian hat.

2084. Wooden drinking vessel.

Made by a "Nakar" Indian living on Naas River, B. C. Presented to the U. S. Military Academy by Lieut. E. P. Murphy, 2d U. S. Artillery.

2085. Board containing four Chinese coins.

No. 1. Chinese coin more than two thousand years old; copper; cast during "Han" Dynasty. No. 2. Chinese coin eight hundred years old; copper; cast by "Sung" Dynasty. No. 3. Chinese coin near seven hundred years old, cast by "Murg" Dynasty. No. 4. Counterfeit of No. 1. Cast privately, not by Government. Under each coin are Chinese characters giving a description of the coins in Chinese. Pekin, July 25th, 69. "To West Point Museum," U. S. M. A. Presented by Major S. C. Lyford, Ord. Dept., U. S. A,

2086. Board containing two bullets.

One a British bullet and the other an American bullet, found on the battle ground at "Lundy's Lane," Canada, after the battle fought between the American and British Armies, on the 25th day of July, 1814. Presented to the U. S. Military Academy by Lucius D. Hill (late Colonel N. Y. Infantry), October, 1884.

2087. Bullet.

"This bullet was recently discovered embedded as you see it in the heart of a timber tree which was being sawed up at a mill near Williamsburg, Virginia. The tree was cut upon the battlefield of Williamsburg. At the time of the battle, 1862, the trees, now being cut, of which this was one, were only a thicket of saplings." Presented to the U. S. Military Academy by Lieut. Chas. Braden, U. S. A.

2088. Two copies of St. Gauden's medals.

These medals were struck in commemoration of the 100th Anniversary of the first inauguration of the First President of the United States, General George Washington. Presented to the U. S. Military Academy by the Committee on the Washington Memorial Arch.

2089. Frame containing the following blue-print photographs.

3-inch mountain howitzer carriage and limber. 3.6-inch B. L. field mortar and carriage. 3.2-inch B. L. rifle and carriage. 3.2-inch B. L. rifle and carriage (Gerdom breech mechanism).

2090. Frame containing the following blue-print photographs.

3.6-inch B. L. rifle and carriage. 5-inch B. L. siege rifle and carriage. 7-inch B. L. siege howitzer and carriage. 5-inch Brown segmental wire wound B. L. rifle, breech mechanism closed.

2091. Frame containing the following blue-print photographs.

Pier at Sandy Hook, Winter 1894. Burst pipes of dynamite gun. Lining tube and broken segment, Brown wire gun. Broken segment of Brown wire gun, end view.

2092. Frame containing the following blue-print photographs.

12-inch gun lift at Sandy Hook. Schuckert search light and tower at Sandy Hook. Three consecutive shots from 8-inch steel B. L. rifle into wood target at one mile range. Locomotive and two 10-inch steel B. L. rifles.

2093. Frame containing the following blue-print photographs.

Circles of 12-inch mortar carriage loaded on car. Lowering 12-inch mortar carriage into pit at Sandy Hook, front view. Lowering 12-inch mortar carriage into pit at Sandy Hook, side view. Lowering 12-inch mortar carriage into pit at Sandy Hook, view from upper left hand side.

2094. Frame containing the following blue-print photographs.

12-inch B. L. mortar on spring-return carriage, side view. 12-inch B. L. mortar on spring-return carriage, rear view. Canet carriage for 12-inch B. L. mortar. 12-inch B. L. mortar on Canet carriage, front view.

2095. Frame containing the following blue-print photographs.

Hotchkiss 6-pdr. R. F. gun. Maxim automatic machine gun, side view. Maxim automatic machine gun, front view. Maxim automatic machine gun, rear view.

2096. Frame containing the following blue-print photographs.

Armstrong 4.7-inch rapid fire gun. Armstrong 4.7-inch rapid fire gun. Driggs-Schroeder 6 pdr. rapid fire gun, rear view. Seabury 6 pdr. rapid fire gun.

2097. Frame containing the following blue-print photographs.

Heavy gun battery, view at Sandy Hook proving grounds. View of heavy gun battery at Sandy Hook proving grouuds. Gantry crane in foreground. View of heavy gun battery at Sandy Hook proving grounds. General view of heavy gun battery at Sandy Hook proving grounds.

2098. Frame containing drawings of rifle projectiles.

Used in the Virginia Campaign of 1864. This drawing shows the projectile used by the U. S. Forces and also those used by the Confederate Forces, and it is signed October 10, 1864. Correct. H. L. Abbot, Colonel, 1st Conn. Artillery, Commanding Siege Train.

2099. Frame containing pane of glass.

With a hole in it made by lightning. Inscription on glass: "I certify on honor that the hole in this pane of glass was made by lightning August 15, 1897, at my home Highland Falls, N. Y. John Rigney, Sergt. of Ord., U. S. A., retired." Presented to the U. S. Military Academy by Sergt. John Rigney, U. S. A., retired.

2100. Model of an Indian house.

The style of Indian houses on the Alaska coast. "This model was made by a 'Chimsian Indian,' at Fort Simpson, B. C. The different parts are marked and it can be easily put together. The bark is for the roof, the pole is attached to the front of the house, and the opening at the foot of the pole, is the door of the house." Presented to the U. S. Military Academy by Lieut. E. P. Murphy, 2nd U. S. Artillery.

2101. Bow and bundle of arrows.

From northwest coast of America. Presented to the U. S. Military Academy by Smithsonian Institution, Washington, D. C.

2102. Bundle of spears.

Used in catching seals in Alaska.

2103. Indian bow and arrows.

2104. Bundle of Apache war arrows.

One of the arrows was picked up after passing through the body of a man. No. 3 is marked on this arrow. Presented to the U. S. Military Academy by General O. B. Wilcox, U. S. A., December 15, 1873.

2105. Indian arrow and bow.

2106. Water color painting.

Representing KeoKöke, a distinguished Sac chief. Painted from nature by P. Rindisbacher.

2107. Water color painting.
Representing Indian women in tent. Painted by P. Rindisbacher.

2108. Water color painting.
Representing scene in Indian tent. Painted by P. Rindisbacher.

2109. Water color painting.
Representing fight between Indians, one with lance and the other with bow. Painted by P. Rindisbacher.

2110. Water color painting.
Representing Indian taking scalp. Painted by P. Rindisbacher.

2111. Water color painting.
Representing Chippewa mode of travelling in spring and summer. Painted by P. Rindisbacher.

2112. Water color painting.
Representing Chippewa mode of travelling in winter. Painted by P. Rindisbacher.

2113. Water color painting.
Representing Trout Fall Portage, in the Hudson Bay Country. Painted by P. Rindisbacher.

2114. Water color painting.
Representing Chippewa canoe. Painted by P. Rindisbacher.

2115. Water color painting.
Representing Indian war dance. Painted by P. Rindisbacher.

2116. Water color painting.
Representing Winnebago war dance. Painted by P. Rindisbacher.

2117. Water color painting.
Representing an Indian chief in war dress, mounted. Painted by P. Rindisbacher.

2118. Water color painting.
Representing the murder of David Tally and family by the Sissatoons, a Sioux tribe. Painted by P. Rindisbacher.

2119. Water color painting.
Representing Chippewa scalp dance. Painted by P. Rindisbacher.

2120. Water color painting.

Representing drunken frolic amongst the Chippewas and Assineboines. Painted by P. Rindisbacher.

2121. Water color painting.

Representing the bison attacked by the dog trains. Painted by P. Rindisbacher.

2122. Water color painting.

Representing mode of chasing the bison by the Assineboines, a Sioux tribe, on snow shoes. Painted by P. Rindisbacher.

2123. Water color painting.

Representing Indians hunting the bison. Painted by P. Rindisbacher.

2124. Indian saddle.

2125. Indian saddle.

2126. Indian arrow case.

2127. Specimen of cloth from Samoa Island.

Marks on tag. "Tapa, from Samoa, November, 1839. Received June 18, 1840, via Boston; U. S. exploring expedition, Capt. C. Wilkes, U. S. N., Commander. Samoa Island native cloth, tapa." Presented to the U. S. Military Academy by Smithsonian Institution, Washington, D. C.

2128. Indian Chief's shield with scalp.

Presented to the U. S. Military Academy by 1st Lieut. W. B. Hazen, 8th U. S. Infantry. Afterwards General Hazen.

2129. Indian Chief's war dress.

Presented to the U. S. Military Academy by 1st Lieut W. B. Hazen, 8th U. S. Infantry. Afterwards General Hazen.

2130. Fejee wallet or basket.

Marked on tag, "Lt. R. E. Johnson, Ex. Ex. Fiji basket." Presented to the U. S. Military Academy by Smithsonian Institution, Washington, D. C.

2131. Fejee girdle.
Worn by females. Marked on tag, "4463 Fejee Islands. Cincture or girdle worn by females. Capt. Magruder, U. S. N." Presented to the U. S. Military Academy by Smithsonian Institution, Washington, D. C.

2132. Head-dress of a Sioux Chief.
"Killed in battle by one of my men in Dakota, 1864. By the hole in the head dress you can see how he was killed. Please present it in my name to the Museum of the Military Academy. Alfred Sully."

2133. Three plates of wrought iron.
From the first American Monitor.

2134. Saddle, English.
Ross and Sayer cavalry saddle as used in the British service.

2135. Case containing hat, bridle, saddle and saddle-cloth.
The bridle and saddle-cloth were presented by the Commissioned Officers of the 2d Division, 2d Army Corps, Army of the Potomac, to Major General John Sedgwick, June, 1863. After General Sedgwick's death his field hat was presented by General McMahon, Chief of his Staff, to General E. Upton, to be put with his horse equipments in the U. S. Military Academy Museum.

2136. General Scott's letter.
In frame giving inscriptions for flag-staffs.

2137. Part of chain stretched across river at West Point, Revolutionary War. Chain at Trophy Point.

"NEW YORK, March 5, 1845.

PETER TOWNSEND, Esq.

MY DEAR SIR :

I have been requested by my friend, Lieut. Wayne, U. S. A., who is stationed at West Point, to obtain for him such information as may be procured in relation to the making, etc., of the chain which was drawn across the river at West Point, in the Revolutionary War. I know of no one to whom I can with more propriety apply on this subject than yourself, being the son of the gentleman at whose iron works this ponderous chain was forged, and familiar as you must be, with all the incidents connected with its history. I have no doubt you can communicate much that will be of interest.

I am sure it will be a pleasing task on your part to give the impress of reality to that which has now almost become tradition.

I am dear sir,

Very truly yours,

(Sgd.) HENRY NICOLL."

"NEW YORK, March 10th, 1845.

HENRY NICOLL, Esq.

MY DEAR SIR:

Your note of the 5th instant is before me and it is with pleasure that I proceed to impart to you such knowledge as I possess in relation to the old chain drawn across the North River at West Point in the Revolutionary War.

Early in the Autumn of 1777, Fort Montgomery, about five miles below West Point, was taken by the British. At this point a chain had been thrown across the river by the Americans to obstruct the passage of the enemies' vessels. It had been made at the Ringwood furnace, New Jersey, was of small diameter and composed of cold short iron of an inferior quality, and upon the surrender of the Fort, fell into the hands of the British. In the first part of the winter of 1778, it was resolved in Council, that West Point was the only site on the Hudson River which was capable of being so fortified as to prevent the passage of the enemies' fleet and measures were forthwith adopted to put the Point in such state. To effect this object it was determined among other things that a chain should be thrown across the river, the links of which were to be double the diameter of those in the chain used at Fort Montgomery, and that it should be constructed of the very best iron the country afforded, and be capable of resisting any force that might be brought against it.

The Honorable Timothy Pickering, one of the most efficient and persevering men of the Revolution, was charged with the duty of procuring the chain in question. My father, Mr. Peter Townsend, of Chester, Orange County, was at this time the owner of the Sterling Iron Works situate at Sterling in said County, in the mountains, at the distance of some 25 miles back from West Point. These works had been in extensive operation for at least thirty years before the Revolution. The iron made there had already acquired a deserved celebrity both in this country and in England, which it has retained to the present day, the works being still carried on by some of Mr. Townsend's lineal descendants. To Mr. Townsend, who was an ardent whig and a warm friend of his country, application was made by Colonel Pickering to make the chain in question. I distinctly remember the arrival of Colonel Pickering at my father's house in Chester late on a Saturday evening in the fore part of March, 1778. His plans were at once warmly entered into by Mr. Townsend, and such was the ardor of the whigs of those days that both gentlemen left Chester at midnight in the midst of a violent snowstorm, and rode over to the Sterling works, a distance of fourteen miles, to take measures for commencing the work.

At daylight on Sunday morning Mr. Townsend had all his forges in operation and his patriotic workmen engaged upon the chain. The work was prosecuted day and night without interruption until its completion, and was finished in six weeks. It weighed 140 to 150 tons, was of unsurpassed quality of Sterling iron and of superior workmanship. It was carted to the river by New England teamsters, in sections, as the same were from time to time completed.

I am, dear sir,

Very truly yours,

(Sgd.) PETER TOWNSEND."

2138. Confederate chain stretched across the river at Nashville, Tenn.

At Fort Clinton.

2139. Rammer.

With copper crook or hook on one end.

2140. Staff with part of sponge.

"FORT HAMILTON, N. Y. Harbor,
October 6, 1843.

DEAR SIR:

In May last I sent you by Lieut. Hunt, 2d Artillery, the sponge used in the service of the six pounder against the Indians in Major Dade's Massacre, 28th December, 1835. Of the identity of the sponge there can be no doubt, as I took it from the battlefield myself in its present condition about six weeks after the massacre, when the dead were buried. It may be interesting to know that with this staff Lieut. Bassinger himself (who was the last man killed), rammed home the only remaining cartridge of the 40 rounds that constituted his supply of ammunition when the battle began.

Very respectfully,
Your obedient servant,
(Sgd.) JAMES DUNCAN,
1st Lieut. 2d Artillery."

Lieut. M. KNOWLTON,
1st Regt. U. S. Artillery.

2141. Sponge and staff,

With crook or hook on one end. This is a brush sponge with wooden staff, an iron crook and wooden handle.

2142. Sponge and staff,

With crook or hook. This sponge staff has a copper hook on one end and a sheepskin covered sponge on the other end, and it also has a canvas cover over sponge-head.

2143. Empty Spanish Mauser cartridge cases and clip.

From the battle-field of San Juan, Cuba. Presented by Prof. Gustav J. Fiebeger, U. S. Military Academy.

2144. Spanish cartridges, copper covered bullet, smokeless powder.

From the battle-field of San Juan, Cuba. Presented by Prof. Gustav J. Fiebeger, U. S. Military Academy.

APPENDIX.

RAPID FIRE GUNS.

267a. Maxim-Nordenfelt 3-pdr. automatic quick firing gun.

FLAGS AND FLAGSTAFFS.

1200. Guidon Company "E," 2nd Massachusetts Cavalry.
(Originally Co. "A," California Cavalry), Capt. Charles E. Eigenbrodt commanding. Capt. Eigenbrodt was killed near Halltown, Virginia, August 25th, 1864, while leading a charge of the 2nd Massachusetts Cavalry. Presented by Prof. Edgar W. Bass, U. S. Military Academy.

1201. Spanish guidon.
Captured at Ponce, Porto Rico, by the American Army commanded by General Nelson A. Miles. Presented by Capt. Ormond M. Lissak, Ordnance Department, U. S. A.

MODERN SMALL ARMS.

1574. U. S. magazine rifle and bayonet, cal. .30″, model 1898.

Hand Arms—Sabres, Swords, Pikes, etc.

1750. Spanish sword with scabbard.
Captured at Ponce, Porto Rico, by the American Army commanded by General Nelson A. Miles. Presented by Capt. Ormond M. Lissak, Ordnance Department, U. S. A.





